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Hydromatics
ON THE B-29

Dwarfing today's mightiest warplanes is the recently announced Boeing B-29 superbomber. Like the long-range Liberator and Flying Fortress bombers already in combat, it is equipped with four dependable Hamilton Standard Hydromatics. The B-29 propellers are built under license by Frigidaire.

HAMILTON STANDARD PROPELLERS
EAST HARTFORD, CONNECTICUT
ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION
(This illustration does not attempt to portray the B-29)

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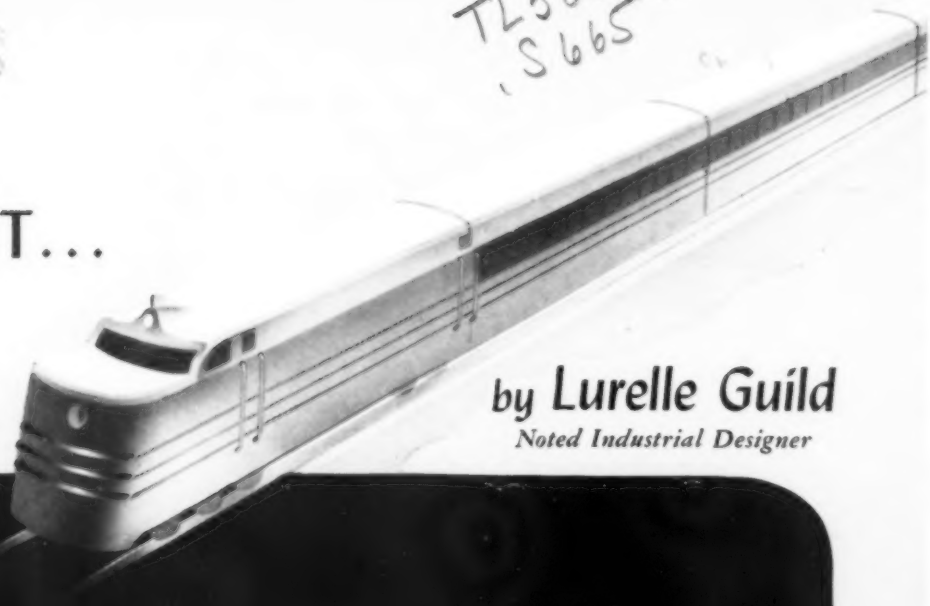
I PREDICT...



by Lurelle Guild

Noted Industrial Designer

The railroad car of tomorrow will make today's de luxe cars resemble the stage coach by comparison. I have designed for one of the country's largest railroads a train embodying numerous new and practical features including super-efficient heating and cooling systems to eliminate dust, germs and draft. Coach passengers will have club car comforts. You'll experience the restful quietness of acoustically-correct, fabric-coated walls; color-corrected, cold cathode lighting with pinpoint lights to spotlight at night the individually reclining seats that will face the windows. Your luggage will be safely secured in individual lockers and all cars will be wired for sound and telephone connections. Yes, your War Bonds will buy you many delightful experiences on the railroad trains of tomorrow.

* * *

Note: The Weatherhead Company, exclusive American manufacturer of Ermeto fittings, made vital parts and assemblies for the railroad industry in its four plants prior to Pearl Harbor. We hope to contribute our services and facilities to this important industry again after Victory is ours.

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Weatherhead

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JAN 22 1944

The Birdmen's Perch

WE'VE DONE IT AGAIN!

IN LINE WITH our tradition of giving the latest and the best to Perch Pilots, we have scooped the world—*maybe the universe!*—to bring you the Al-Flutter line of Prefabricated New Year Resolutions.

No fuss, no trouble—simply check any 5 of the following 5 promises:

☐1. I will buy an *extra* War Bond.
☐2. I will give some more blood.
☐3. I will use Gulfpride Oil.
☐4. I will use Gulf Aviation Gasoline.
☐5. I will remember that 70% of airplane accidents are caused by stalling out of a low turn.

Major Al Williams,

alias "Tattered Wing Tips"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh, Pa.

BRAINTWISTER

A mess officer in North Africa got a bill from the local butcher for "meat and fowl with 36 heads and 100 feet." He finally was able to figure how many animals and how many birds this strange itemization represented.

The question is, can you?

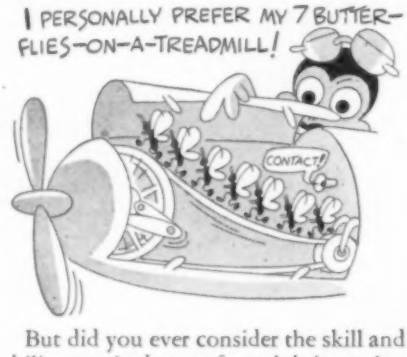
If you can't, we'll send you the answer for a post card.

55 INCHES—2200 HORSES

As the crow flies, 55 inches is a minor distance.

In fact, you can stretch your hands that far apart. Nevertheless, airplane engine makers were able to cram 575 horsepower into an engine only 55 inches in diameter, way back in 1927.

Today, engines are being built that deliver 2200 horsepower . . . and they're still 55 inches in diameter! That speaks pretty highly for the skill and ability of the engine makers, doesn't it?



But did you ever consider the skill and ability required to perfect a lubricant that could take the *stupendous* punishment of such an engine? We mention that because we're pretty proud of our laboratory men.

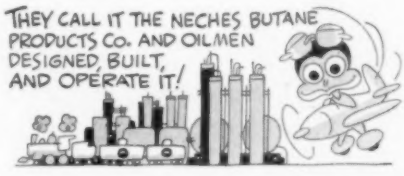
We're proud of their technique of refining a lubricating oil from crudes—*and then refining it some more!* They call this technique the Alchlor Process. We call the oil Gulfpride.

And because the *extra* refining step gets *extra* sludge-makers and carbon-formers out of Gulfpride . . . Gulfpride gives *extra* protection—even to engines of 2200 hp.

246,000,000 POUNDS OF RUBBER—COMING UP!

24 months ago, Gulf and four other petroleum companies had an idea.

Today, that idea is a multimillion dollar butadiene plant which covers 314 acres and will make enough butadiene to give America *246,000,000 pounds of synthetic rubber a year!*

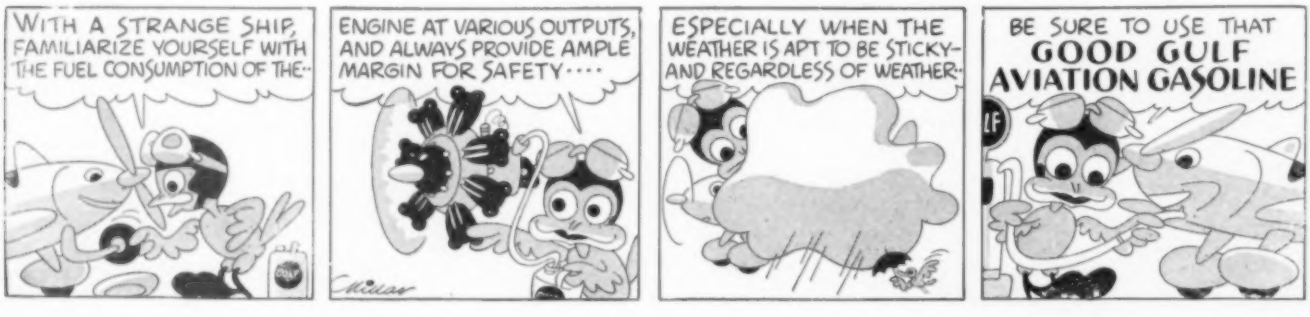


This incredible production record is an example of how industrial teamwork is solving our war problems almost as fast as they come up. And it's also an example of the amazing range and diversification of Gulf's war activities.

Gulf Oil Corporation and Gulf Refining Company...makers of

GULF AVIATION PRODUCTS

OIL IS AMMUNITION—USE IT WISELY


WITH A STRANGE SHIP, FAMILIARIZE YOURSELF WITH THE FUEL CONSUMPTION OF THE-
ENGINE AT VARIOUS OUTPUTS, AND ALWAYS PROVIDE AMPLE MARGIN FOR SAFETY····
ESPECIALLY WHEN THE WEATHER IS APT TO BE STICKY-AND REGARDLESS OF WEATHER-
BE SURE TO USE THAT GOOD GULF AVIATION GASOLINE

P-38 TEAM

PLANE, PILOT, GROUND CREW—IT TAKES ALL THREE TO WIN A FIGHT!

You've heard plenty about P-38's and the pilots who fly them. But under the tough conditions of modern war, they wouldn't be flying long without the third part of the team—the ground crew. The men who keep Lightnings in action are specialists. They've been trained at the factory, not just to repair *airplanes,* but to repair *Lightnings.* At Lockheed's service school they have taken them apart and rebuilt them. They have put in new hydraulic and fuel systems, new wiring and controls. They have learned to make emergency repairs—like fixing a riddled gas tank with tin cans and scraps of rubber. They know how to get a plane back into the air and *keep* it there.

Lockheed is the first aircraft manufacturer to operate a factory training school for ground force personnel. It has turned out to be a mighty valuable operation, for today there are over 14,000 Lockheed trained men scattered throughout the world servicing P-38's, Venturas and other fighting planes.

Yes, it takes plane, pilot and ground crew—all three—to make a fighting team. The news reports are telling you better than we can what an expert job they're doing.

LOCKHEED SERVICE

FIRST TO ESTABLISH A FACTORY TRAINING SCHOOL

LOOK TO *Lockheed* FOR LEADERSHIP

LOCKHEED AIRCRAFT CORPORATION, BURBANK, CALIFORNIA

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POWER

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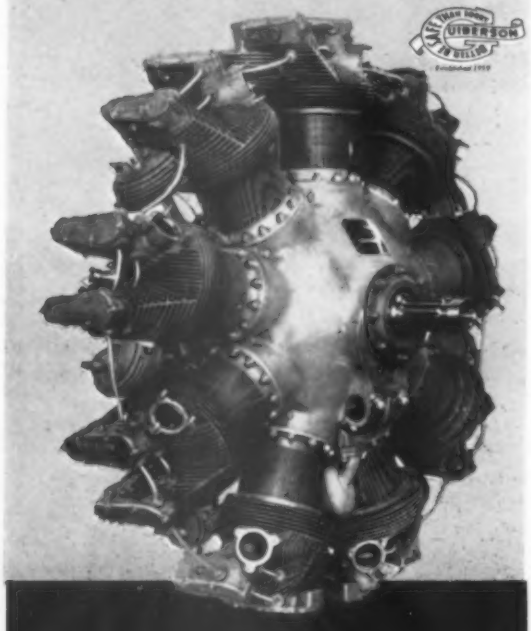
Using fuel that will not burn even when exposed to open flame, the Guiberson completely eliminates the usual fire hazard from the power plants of tanks, planes and ships, and there is no ignition system to cause sparks or interfere with radio operation. Weighing less than two pounds per horsepower, the new light weight Guiberson diesel hits harder, faster, farther. Safe and dependable, Guiberson powered equipment is hitting the Axis on the battle lines of the world and is ready to serve on land, sea and in the air.



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JANUARY, 1944 VOL. XXI, NO. 1

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NO MORE CLEARANCES

Not many of us will ever forget the day after Pearl Harbor when military authority through the Civil Aeronautics Administration, ordered all civilian aviation grounded at once. That's been exactly two years ago and a lot of water has passed under the bridge. The grounding order was soon relaxed and after necessary precautions were taken to guarantee no possibility of sabotage from the air, there followed the period of civilian flying operating under heavy but sensible restrictions that included written clearances for every flight, designation of airports, the necessity for guards and airport policing, the prohibition of any civil aviation activity on the Atlantic and Pacific coasts' vital defense zones.

Late in December, Charles I. Stanton, Administrator of Civil Aeronautics, announced the happy news that the burden of paper writing imposed on pilots is to be lifted for those flying outside vital defense areas. The pilot flying between points outside vital defense areas will no longer be required to file clearances and arrival notices.

Other curbs also have been lifted. The requirements for basing aircraft, for maintaining twenty - four - hour guards and the certification of airport personnel have been eliminated. An airport now must merely maintain an accurate airport register on CAA Form 960 while the airport managers will be responsible that aircraft are not operated under any conditions by unauthorized persons.

In announcing the lifting of these restrictions, Mr. Stanton said: "As the battlefront moves farther from our shores, we hope it will be possible to ease the restrictions on civil flying even further, so that by the war's end the stage will be set for a great increase in private airplanes."

This statement not only contains a great deal of hope for ultimately lifting restricted operations along our coast lines, but simultaneously reveals a welcome and sympathetic attitude of the present Civil Aeronautics Administration and its far-seeing administrator toward civilian flying activities and development.

We must remember this, however: although certain burdensome restrictions have been eliminated, all pilots, and especially airport operators and managers, have a serious responsibility to fulfill. They must see to it that an accurate airport register be maintained and above all that not a single loophole can possibly exist for aircraft to get into the hands of unauthorized persons. By shouldering this responsibility and by efficiently dispatching the minor duties now required, we will achieve a clean operating record, maintain absolute airport security and thereby pave the way for lifting the last remaining restrictions on civil aviation which were brought about by wartime conditions.

One of these last remaining restrictions might well be lifted now—the WPB limitation order L-262 that creates so much paper work and delay in buying and selling used aircraft. The WTS is beginning to release airplanes, and R. McLean Stewart, CAA-WTS boss, announced to the NATA convention last month that other airplanes will be released shortly. It is therefore ridiculous to retain this barrier to airplane trading any longer. A little pushing from the proper sources might wash it out immediately.

CAVU for the NATA

There's a complete summary of the National Aviation Training Association annual convention elsewhere in this issue, but this department believes NATA deserves an especially large bouquet and a round of applause for its spectacular accomplishments during the past year and the promising future so brilliantly reflected in the plans formulated during the St. Louis convention last month.

First of all, there is high wisdom in the choice of the new name for the organization, "The National Aviation *Trades* Association," which automatically drops the limiting character of the term "training" and paves the way for an all-inclusive organization specifically in business for all branches of non-scheduled aviation. Although NATA has always carried the ball for the fixed-base operator and even the private owner of airplanes, its membership was largely made up of the old CPT contractors, now War Training Service contractors.

Distributors, and the manufacturing and supply houses, through their Aviation Distributors and Manufacturers Association, which held their first annual meeting in conjunction with the NATA convention, have now joined up in partnership, which creates, for the first time in history, a hard-hitting, solid-front organization that's strong enough and adequately organized to provide for the security and welfare for non-scheduled civil aviation operators.

The significance of this development cannot be over-emphasized. In the first place, previous attempts in years gone by failed miserably to organize the highly individualistic and heterogeneous airport and fixed-base operators scattered all over the nation from Maine to California. It didn't seem possible and skeptics in great number said it just couldn't be done. We ourselves almost fell into the ranks of the skeptics when the growing pains of NATA once made it appear all hope was lost.

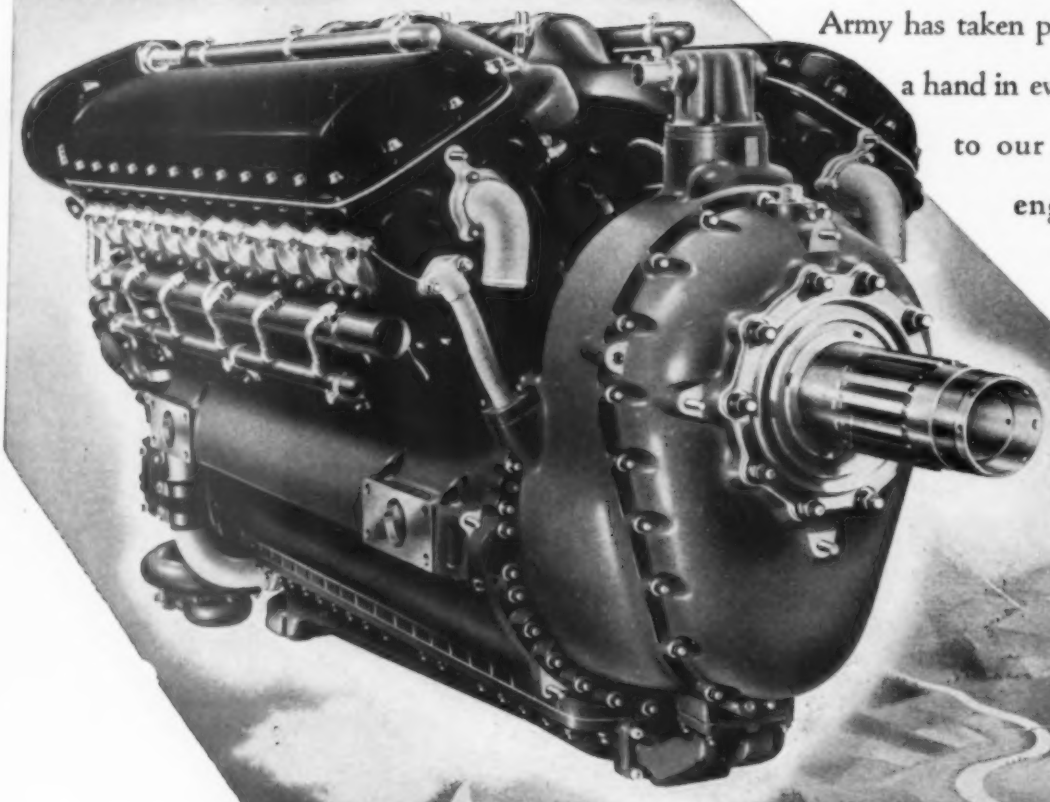
But the job has been accomplished. Everyone who attended the St. Louis convention last month is convinced. Non-scheduled civil aviation at long last realizes that a house divided against itself cannot stand.

All credit is due to that hardy band of leaders who stayed with the ship through the roughest hurricanes — the newly elected president of NATA, Roscoe Turner; and "Pops" Mooney, whose perseverance and never-say-die spirit was always a fundamental element in guiding the destinies of the organization; Les Marsden, John Wilson, Les Bowman, Bill Ong, and others too numerous to mention, who spent their own time and money to keep CPT and WTS alive and active in the face of almost insurmountable obstacles.

Now that the NATA has emerged from the ranks of a limited training association into a trades association truly representative of the airport or fixed-base operator, the WTS contractor and those individuals and firms who have been in close contact with the public for years, there's no room for any doubt about the future for this vital segment of national aviation. It's truly CAVU weather ahead.

THE ENGINE THAT IS ALWAYS THERE

Allison-powered planes have been called upon in every major engagement in which our Army has taken part. ★ They have had a hand in every great land victory to our credit. ★ Allison engines always — for dependability and brilliant performance!



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Back the Attack – with War Bonds

Firepower of a Fortress

This is a sight that Axis pilots have learned to dread.

It is one of the reasons the Japs announced that America had introduced a "four-engine *fighter* plane," when a new model of the Boeing Flying Fortress* first went into battle action in the Pacific.

It is why British Air Chief Marshal Sir Philip Joubert recently declared: "It almost looks as though the Fortress type of bomber has defeated the contemporary fighter."

The main job of the Fortress is, of course, high-altitude precision bombing. Its objectives are often deep in enemy territory, hundreds of miles beyond the range of fighter escorts. Fortress crews, therefore, must be equipped to handle the hottest opposition the enemy can send against them.

They are! Each Fortress can spit thousands of bullets in any direction, with deadly accuracy up to half a mile. A formation of 18 Fortresses can place a curtain of fire around itself totaling more than 5 *tons* of lead a minute!

That's why the Fortresses are chosen, day after day, for the toughest assignments. Their crews are among the finest in the world. In addition to the almost unbelievable accuracy of their bombing, they have earned for the Fortress the description of "deadliest fighter-plane destroyer of the war."

You will find that Fortress crews have deep respect for Boeing design and engineering, whole-hearted confidence in Boeing integrity of manufacture. They have good reason to know that . . . if it's "Built by Boeing" it's bound to be good.

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS **BOEING**

*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS

"Cat" landing on AEROLS*

Affectionately known as the "Cat," Consolidated Vultee's amphibian airplane, which is named the Catalina, is in the news almost constantly on both our eastern and western battle fronts.

More than an abbreviation, "Cat" aptly suggests this plane's easy grace in landing. The Catalina lands with the legendary surefootedness of the cat because it is equipped with Aerols.

Aerols are an *established* advancement in aircraft safety and comfort. To cushion landing shock, Aerols are used not only on Catalinas, but on most types and sizes of American aircraft.

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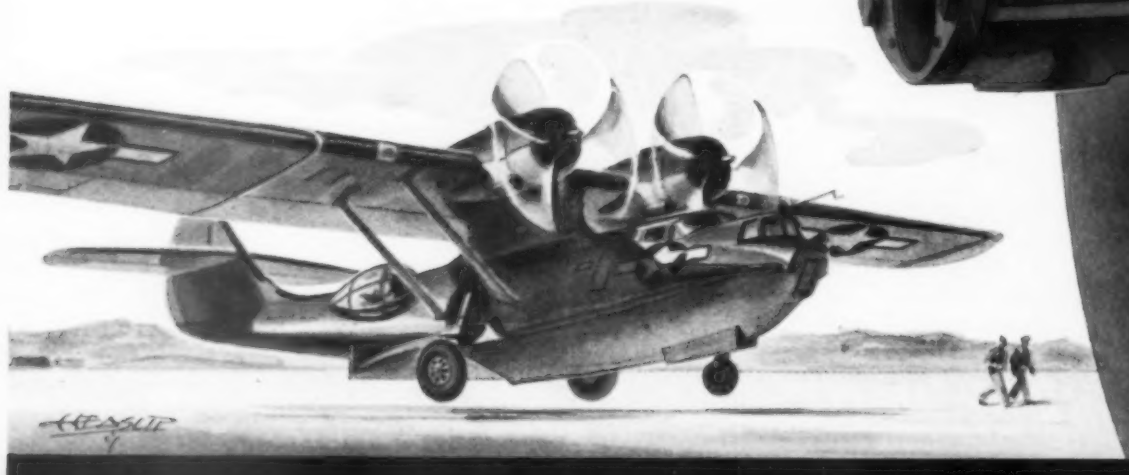
AIRCRAFT DIVISION • • **CLEVELAND 5, OHIO**

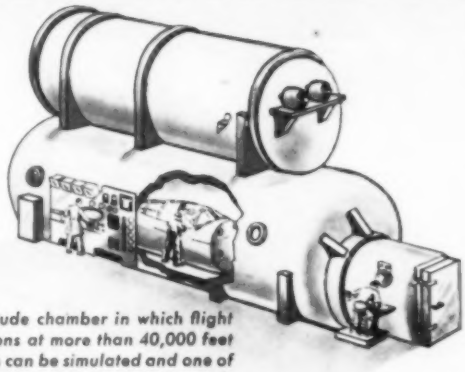
Also Manufacturers of Cleco pneumatic tools for the aircraft and general industry, Cleco sheetholders, Cle-Air shock absorbers for trucks and buses, and Cleveland rock drills for mining and construction work.



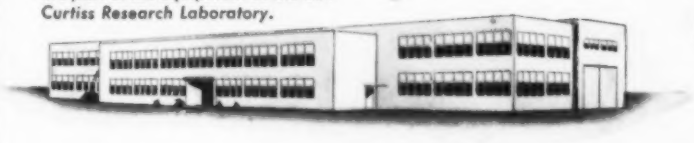
AEROLS

*THE SHOCK ABSORBING UNITS ON AN AIRPLANE'S LANDING GEAR; THE NAME IS DERIVED FROM THE WORDS "AIR" AND "OIL"—THE FLUIDS USED TO DISSIPATE THE LANDING SHOCKS

KEEP YOUR EYE ON *Tomorrow's Horizons*



An altitude chamber in which flight conditions at more than 40,000 feet altitude can be simulated and one of the world's most modern wind tunnels are part of the equipment at the new Curtiss Research Laboratory.

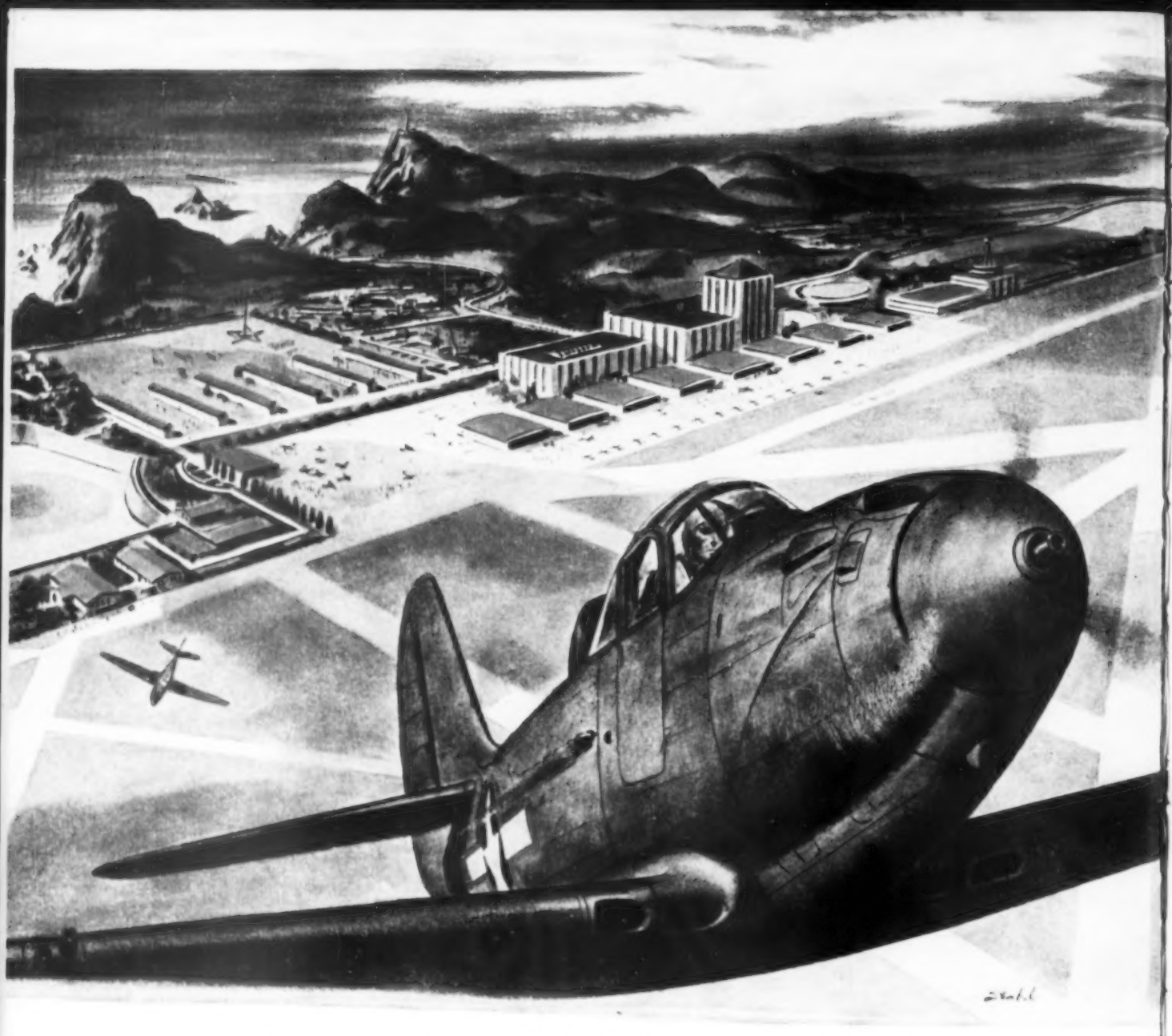


Beyond measure are the engineering advances, the improvements in manufacturing methods, which are the product of Curtiss-Wright's vast wartime program. When war is done, this rich experience will give the world safer, speedier, more luxurious airliners—swifter, more economical cargo carriers.

LOOK TO THE SKY, AMERICA!

CURTISS-WRIGHT
Corporation
AIRPLANE DIVISION
BUFFALO • COLUMBUS • ST. LOUIS • LOUISVILLE

MEMBER, AIRCRAFT WAR PRODUCTION COUNCIL, EAST COAST, INC.



"SKYTOWN," U.S.A.
pop.: 2,000,000

Very soon now, there'll be well over 2,000,000 men in the U. S. Army Air Forces.

Flight is their business.

War has taught them the machines, the techniques, the language of flight. They recognize no impassable barriers of land or sea.

There's many a man among these two million who pilots the U. S. Army Bell Airacobra. In his single engine fighter, he can be 20,000 feet in the sky—seconds after he leaves the earth. Sixty minutes later he can be more than 400 miles away ... blasting out a pattern of victory with machine gun bullets and cannon shells.

It's as if he had moved to a strange new city (Skytown, U. S. A.) and adopted a new way of life.

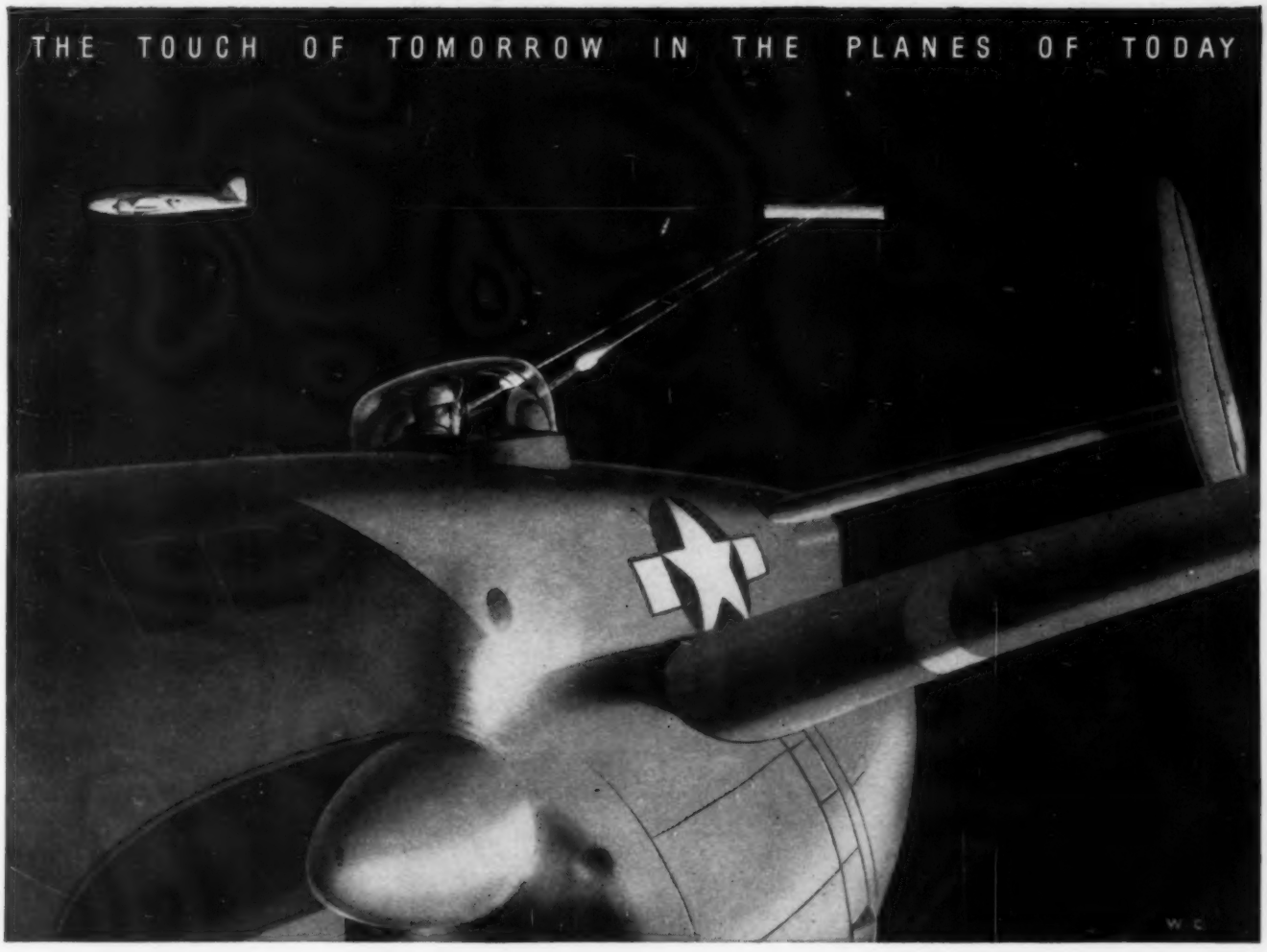
MEMBER AIRCRAFT WAR PRODUCTION COUNCIL—EAST COAST, INC.

MAKE NO EARTHBOUND PLANS FOR THESE 2,000,000! After the war, they—and you—will fly. You'll fly in superior planes of peace because this war has taught us some lessons, too. How to break with precedent in designing aircraft to do specific jobs. How to pioneer better, faster, less costly methods of mass production. © Bell Aircraft Corporation, Buffalo and Niagara Falls, New York.

BELL *Aircraft*

AIRACOBRAS for victory—future planes for peace

BUY WAR BONDS AND SPEED VICTORY



It All Adds Up To Subtracting Zeros

Today's apprentice gunner enters a deadly trade—defending American bombers against attacks of Jap Zeros and other enemy fighters.

To follow his trade and survive, the gunner first has to learn how to "polish 'em off around the clock." His training must be thorough and painstaking, and it must come within a hair's breadth of being the real thing. That's why Fairchild developed the GUNNER.

This advanced trainer has the essential characteristics of the bombers from which our student marksmen will soon shoot it out with Axis pursuits. From a power turret, similar to one on a Flying Fortress, each fledgling is taught to pick off tiny targets while moving at better than 200 miles per hour. It's fast, tricky work and it takes a keen eye, steady nerves, precision equipment. It's the kind of training that pays off when the chips are down.

Fairchild's GUNNER, from which apprentice marksmen will step into bombers and thence into action, is one of the largest, speediest training planes ordered by the Army Air Forces. Powered by two 12-cylinder, inverted, in-line, air-cooled Ranger engines, the GUNNER is a typical example of Fairchild's "touch of tomorrow in the planes of today."

BUY U. S. WAR BONDS AND STAMPS

Fairchild Aircraft

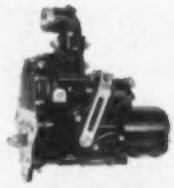
Division of Fairchild Engine & Airplane Corporation, Hagerstown, Maryland.....Burlington, North Carolina

Putting the Teeth in it!

"X" MARKS the spot where the gears must begin to mesh, in assembling a Bendix-Scintilla* Aircraft Magneto. Even though all gears are held to precise individual tolerances, they come down the line in matched sets... with "x's" hand-etched on the first contact teeth. And that precision may well help to mark the spot for a Jap or a Nazi flier.

The engineers of Bendix-Scintilla Aircraft Magnetos, Harnesses and Switches have scored important advances in aircraft ignition *design*. But ingenuity in achieving and maintaining even higher standards of *production quality*, is no less important. Only thus can our airmadas turn the American margin of inventive genius into an actual margin of superiority in battle.

Particularly is this true of the ignition equipment that must control and deliver 40,000 sparks per minute to an aircraft engine... each timed to a split second. The workers of Bendix-Scintilla know this. Many of them can already see, in our Vehicles of Victory, the wondrous Transports of Tomorrow. But right now the job of these precision gear assemblers is war, exclusively... and like the pilots of our fighting planes, they are "putting the teeth in it."



BENDIX SCINTILLA

THE WORLD'S FINEST AIRCRAFT IGNITION

Bendix-Scintilla Aircraft Magnetos, Harnesses and Switches, vital members of "The Invisible Crew," are standard equipment for the major aircraft engine manufacturers, including:

Allison • Jacobs • Continental • Lycoming • Lawrance • Wright Aero Corp. • Pratt & Whitney • Warner • Packard • Ranger • Ford • Nash • Chrysler • Kinner.

SCINTILLA MAGNETO DIVISION

THE INVISIBLE CREW

Precision Equipment by Bendix Aviation Corporation

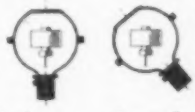
*TRADE MARK OF BENDIX AVIATION CORPORATION

NOW AZIMUTH INDICATIONS STABLE AS A GYRO

The NEW GYRO FLUX GATE* COMPASS

. . . provides steady, extremely accurate indications even during steep dives, fast turns, in rough weather, and near the earth's poles

THE TRANSMITTER contains the Flux Gate. This sensitive earth inductor compass element is mounted in the wing where electromagnetic disturbances are at a minimum, and is held horizontal—even when the airplane pitches and banks—by an electrically driven gyro. Deviation is small and a special type compensator is used to neutralize this error, resulting in indications of magnetic heading that are practically perfect. Variation may be introduced into the system; then the dials show true heading. INDICATIONS are derived from signal voltages initiated by the Flux Gate, a triangular-shaped element whose three legs cut the earth's field at different angles, producing three different signals. This triad of signals varies with changes in heading. The tiny voltages are electronically amplified, and converted into torque, rotating the pointer of the master indicator. The associated Magnesyn* system is simultaneously set in operation, causing the repeaters to duplicate the master compass reading.



☆ ☆ ☆

The Pioneer* Gyro Flux Gate Compass System is an important member of "The Invisible Crew" of precision equipment which more than 30 Bendix plants are speeding to world battle fronts. Eclipse-Pioneer Division, Teterboro, New Jersey.

PIONEER INSTRUMENTS

*TRADE MARK OF BENDIX AVIATION CORPORATION

THE INVISIBLE CREW
Precision Equipment by
Bendix
Aviation Corporation

Revving Up

AUTHORITATIVELY SPEAKING: We're lining up for the New Year a series of articles by outstanding writers. The inaugural appears on page twenty-three—a timely and factual analysis of strategic bombing by Lucien Zacharoff, author, lecturer, consultant and associate editor of AERO-SPHERE. . . We can hardly wait to give you next month's inspiring comment regarding the air war in China, written exclusively for us by Colonel Robert L. Scott, Jr. This master writer needs no introduction — his book on his career and China combat, called GOD IS MY CO-PILOT, was reviewed by us in October and is a best-seller. We're mighty proud of these scoops — and promise more of the same. Stick around.

★ ★ ★

HELP WANTED — AND NEEDED: **No war industry is more vital than the great research program of the National Advisory Committee for Aeronautics. To meet critical military objectives, NACA is in urgent need of machinists, toolmakers, instrument makers, pattern makers, electricians, welders, metalsmiths, model-makers, engine and airplane mechanics, wind tunnel mechanics and professional engineers, physicists, chemists, etc. Full details can be obtained from the Personnel Officer at NACA Research Stations at Langley Field, Va., Moffett Field, Calif., and Cleveland (Ohio) Airport.**

★ ★ ★

FEEDBOX STUFF: You're probably used, by now, to all the free advice and tips from the "experts" who've been talking down to you for the last twelve months. As for our outlook for 1944, before it's very old, we'll just make some sounds like an "expert" and let it do for the rest of the year: Quote—If air power doesn't make the Nazis quit by March, the Allied invasion will move across the Channel — although, of course, a better showing might be made along other shores of Festering Europe. On the other hand, there's always the chance Hitler is cheating — maybe he's got a collapsible fortress roof tucked away in a bunch of lager basements. But the die has been cast, so look for action — any kind of action — to end the war in Europe. As for the Japanese, our Navy has them outnumbered, only they're not where our Navy is. But they're retreating —from island to island. But beat Japan we will, even if we have to send Chennault and Kenney some stuff from England when the B-29's reach the "priority" front. Of course our airplanes are unexcelled anywhere, although those Focke-Wulfs and a few other types rumored about are not exactly what our pilots would call pushovers. Don't look for Russia to do anything to Japan, or let us use any Russian bases, until a ninety-day notice of intention is posted. The Japs might call off some agreements, or whatever they use for promises, and then where would we be? (You're right — just where we've always been: Out in the cold.) On the other hand, the Russians are realistic. They might know this, too. That about sums up the picture, except for this parting reminder: Of war there shall be more in 1944. Unquote.

★ ★ ★

POSTWAR GIVEAWAY: **If folks around your town are postwar aviation-minded (and who isn't?) you can help them by taking advantage of a neat little deal we heard about the other day. A booklet called "What Your Town Needs in the Coming Air Age" can be obtained for the asking from the Cub people, Piper Aircraft Corporation, Lock Haven, Pa. It gives some practical examples of how any town can lay plans now for sensible peacetime landing facilities without bankrupting the taxpayers (meaning you).**

by
CHARLES A. ZWENG
Author of
"Radio & Instrument Flying," Etc.

FLIGHT INSTRUCTOR

A new and different book—a must for every Flight Instructor, and a book needed by every student. Printed with the new easy-to-read type and with all flight maneuvers fully illustrated. This book shows the new "series of turns" and "series of eights". Here will be found standard methods of flight instruction with explanations of flight maneuvers in primary, intermediate and advanced training.

Other new features include flight examiners and methods of grading. A new section covers information concerning Load Factors. Typical flight instructor's examinations "multiple choice" are covered in the last section. 480 pages handsomely bound in blue leatherette with gold letters. Price $4.00 postpaid or C.O.D.

OTHER OUTSTANDING AVIATION BOOKS

COMMERCIAL and PRIVATE PILOTS: New "Aeronautical Training" fully covers new multiple choice examinations, with drift off-course and alternate airport problems plotted and solution given. Commercial examinations are shown in separate section of the book. Navigation, Meteorology, Aircraft, Engines and CAR covered. Just published —12th edition only $3.00 postpaid, or C.O.D.

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GROUND INSTRUCTOR: Written for the student preparing for "Ground Instructor Ratings." Excellent for class work. Covers Navigation, Meteorology, Aircraft and Theory of Flight, Engines and Civil Air Regulations. 1943 Edition. $3.00 postpaid or C.O.D.

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AIR NAVIGATION (Gold Medal Edition) includes meteorology, just published, $3.50.

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SIMPLIFIED CELESTIAL NAVIGATION by P. V. H. Weems and E. A. Link, Jr. $3.00 postpaid.

NEW DALTON NAVIGATION COMPUTER (Type E-6B), $10.00.

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12021 Ventura Boulevard
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FIRST TO FLY

from New York to East Europe

NON-STOP!

DISTANCE MARK SET BY ISTANBUL FLIGHT

Deviated Very Slightly From Direct Course, Going 5,039.5 Miles— Overcame Obstacles Before Hop.

Russell Boardm
lando have flown
jump from point
had ever flown
than-air machi
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Frenchme

U. S. Army Air Forces Photo

The Cape Cod took off July 28, 1931. With only a 420 hp Whirlwind engine she lifted a total load of over 7,500 lbs., including 749 gals. of gas and oil — flew a world's record of 5,040 miles non-stop to Turkey.

Caption of news-photo says: "The Cape Cod ... as she was guarded from the curious after the arrival at Istanbul." Russell N. Boardman and John Polando were at the controls.

One of the many U.S. Army Air Forces B-24 Liberators that raided Ploesti, skimming in low through dense oil smoke.

The AT-21-BL gunnery crew trainer, now in production at Bellanca Aircraft Corporation for the United States Army Air Forces.

Across the Atlantic...across Europe ...across the Balkans...first to fly 5,000 miles non-stop from New York to Istanbul...that was the pioneering air trek of the Bellanca cabin monoplane which re-captured the world's long distance record for America in 1931. Of greater importance to wartime America was the 1943 raid by Army Air Forces B-24 bombers, first to attack Ploesti and wreck the big Rumanian oil refineries. Theirs was a mission second to none for military daring and success. But the historic Bellanca flight, twelve years ago, was a significant preview of coming American air power. And today, as pioneers of long distance planes, Bellanca engineers are working for Victory in the production of precision-built bomber equipment, vital warplane components and the AT-21-BL gunnery crew trainer. Bellanca engineers are planning, too, for *your* peacetime aircraft of tomorrow!

K E E P O N B U Y I N G
U. S. WAR BONDS

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When an airline captain attains the title "Million Miler" it speaks for itself. Sixteen Braniff flight captains have achieved this enviable mark . . . and several are well along toward their second million.
Veteran airmen such as these have made air transport one of today's most dependable means of travel. They took in unhesitating stride the flying of military cargo over foreign routes for our armed forces. Their "know-how" will help pace Braniff's contribution to the development of tomorrow's scheduled air transportation.
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THE majority of those who use and respect Kollsman aircraft instruments know them most intimately as sentinels on the airplane instrument panel, indispensable to the plane's precise and dependable operation.

But long before our war-birds ever get into service, many engineers certify their design and performance with Kollsman instruments in wind tunnels, engine test cells and in test flights.

Because of their accuracy, standard Kollsman instruments are found in frequent use for many forms of aeronautical experiment and in production testing. In addition, many special Kollsman instruments have been developed for these uses.

KOLLSMAN AIRCRAFT INSTRUMENTS

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ELMHURST, NEW YORK • GLENDALE, CALIFORNIA

WHAT'S THIS MAN'S ARMY COMIN' TO ?

It's like I was sayin' to the lootenant just the other day. "Sir," I says, "there's times when I wonder what this man's army is comin' to. Man and boy, I been soldierin' thirty years now, but lately I'm beginnin' to wonder.

"First they take the cavalry and put 'em in tanks . . . or mechanized cavalry they call it! Mebbe it's all right but, personally, I can't see what business any self-respectin' cavalryman has in one of them king-size sardine cans.

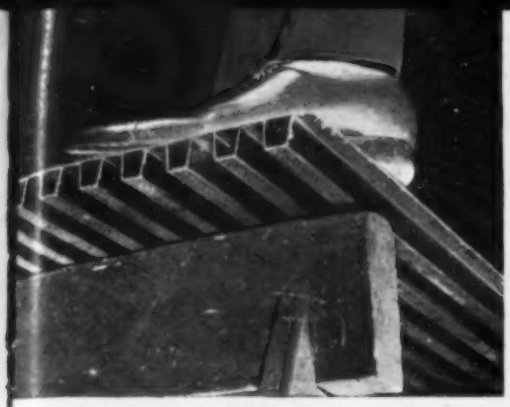
"But that ain't all, sir," I says. "Now they've cooked up this here air-borne infantry.* I seen plenty in my day, from Panama to Shanghai to ole Paree, but I never thought I'd live to see the day when them foot-sloggin' G.I.'s would be ridin' around in airplanes.

"I ask you, sir. Ain't there *nothin'* sacred no more?"

** For the edification of the Sarge (bless his antiquated soul), the air-borne infantry—like the mechanized cavalry—was created to give our army the added speed, mobility and hitting power so strikingly demonstrated in Sicily. And also for his information, we'd like to add that the air-borne infantry's "airplanes" are often* WACO *gliders . . . designed by* WACO *. . . built by* WACO *and fifteen other manufacturers using* WACO *design and engineering supervision.*
THE WACO AIRCRAFT COMPANY, *Troy, Ohio, U. S. A.*

WACO AIRPLANES

ALL ARMY CARGO-TRANSPORT GLIDERS ARE WACO DESIGNED



PANELYTE FLOORING for aircraft, new Martin plastic-aluminum combination, weighs approximately ¼ lb. less per sq. ft. than other floorings. This, and other uses of Panelyte, mean big savings in weight and money for airline operators.

FLUTTER DETECTOR, plus accelerometer and oscillograph, enables Martin engineers to record graphically a plane's flutter characteristics. This development will aid all industry in combating vibration.

LEAK-PROOF FUEL TANKS, America's first, were developed by Martin, are now standard equipment on many makes of U. S. aircraft. Martin experiments on self-sealing fuel tanks date from 1919 in which time 285 materials were tested.

"FIRSTS" for Peace · · "FIRSTS" for War

From Martin Research Laboratories!

ALL-PLASTIC NOSE, giving bombardier full visibility, was first used on Martin Marauders, now used on many U. S. aircraft. Martin plastic research goes back to 1921. Today some Martin planes contain 400 plastic parts.

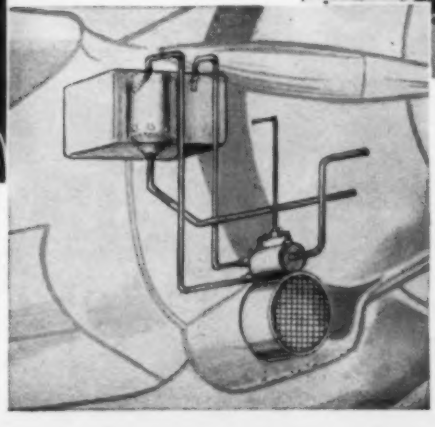
ON this page are pictured just a few of the Martin firsts which help make U. S. aircraft second to none. Other Martin developments are still cloaked in military secrecy, while numerous others, individually minor but collectively important, are in use throughout the aviation industry to give America better planes and more of them. Vital to victory today, these Martin firsts will play outstanding peacetime roles tomorrow, not only in aviation, but in scores of diverse industrial fields. Post-war products of every sort may bear the words "Made by Martin" as a guarantee of excellence.

THE GLENN L. MARTIN COMPANY, BALTIMORE, MARYLAND, U. S. A.
THE GLENN L. MARTIN NEBRASKA COMPANY—OMAHA

Martin
AIRCRAFT
Builders of Dependable Aircraft Since 1909

SKIN SHRINKER, ingenious product of Martin engineering, heats the aluminum skin of a plane's wing so that after riveting it cools and shrinks tightly into place without wrinkling or buckling.

NEW DILUENT-LUBRICATION SYSTEM, (below) devised by Martin engineers, provides instant starting in cold weather. After Victory the Martin system will be available for commercial aircraft, trucks, tractors, buses, private automobiles.



POWER TURRETS like this (above) . . . developed and manufactured by Martin . . are now standard on many types of U. S. aircraft. America's first power-operated gun turret appeared on the Navy's Martin PBM-1 patrol bomber back in 1937.

Specializing in . . .
Aircraft Parts Production

At their new plant in New Britain, Connecticut, Fenn Aircraft Division is specializing in production manufacture of aircraft and aircraft engine subassemblies and parts.

Sub-contracting of subassemblies and parts is now a well established principle of airplane manufacture. Since the start of the war, well aware of this trend, The Fenn Manufacturing Company has organized to perform a specialized, highly coordinated service to the aircraft industry.

Skilled in working with all kinds of ferrous and non-ferrous alloys, adequately equipped and tooled for production manufacturing to precise tolerances, and headed by a capable management and engineering staff, Fenn Aircraft assures for the Aviation industry, now and after the war, a dependable source for subcontract work.

Fenn Aircraft **NEW BRITAIN CONNECTICUT**

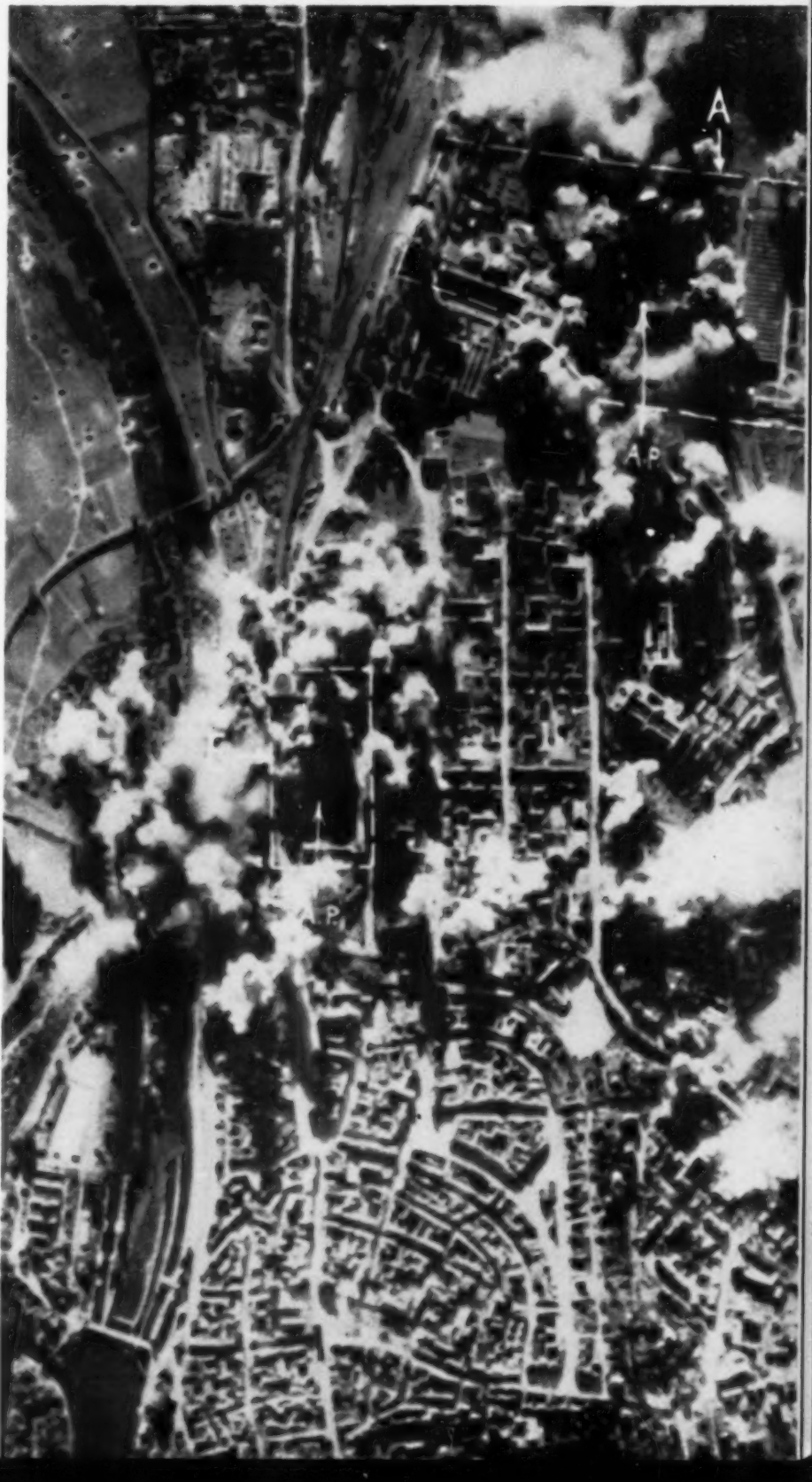
DIVISION OF FENN MANUFACTURING COMPANY

MANUFACTURERS OF AIRCRAFT SUBASSEMBLIES AND PARTS

Precision bombing was demonstrated at Schweinfurt, Germany, when U. S. Fortresses aimed at individual factories, as depicted in the photo at right. Schweinfurt had produced at least half of Europe's ball bearings and three-fourths of those made in Germany itself. Aiming points and vital areas are designated.

—(AAF Photo.)

STRATEGIC PRECISION BOMBING



Present and postwar effects of the U. S. Army Air Forces' precise strategic bombing of the enemy are unique in warmaking history. This searching analysis by a noted aviation writer explains its purposes.

By LUCIEN ZACHAROFF

MANY bombardment missions by United States Army Air Forces against targets within Germany preceded the raid on Vegesack on March 18, 1943. Many missions have been recorded since, and with even more telling effects. But that date will loom large in the annals of historians of modern warfare. The success of that mission marked the end of the experimental stage in daylight high-altitude precision bombing. It reaffirmed the American philosophy of air war and its place in the Allied design for bringing the chief Axis partner to his knees in the shortest order.

When the smoke of the Vegesack engagement lifted, the box score read: U. S. planes lost, two; German planes destroyed, fifty-two; German planes probably destroyed, twenty; German planes damaged, twenty-three.

However, we know only too well by now that it is not the score of the battle in the air that counts, but rather its repercussions on terra firma, and, as in the case of Vegesack, in aqua pura. At that significant submarine base, of fifteen U-boat hulls on the slips, seven were almost certainly damaged severely. Only two escaped damage. The power house was virtually completely demolished. Shops and other structures were damaged. Even if the subs on the slips had not been so mercilessly mauled, the damage

to buildings might have proven sufficient to reduce the yard's efficiency to a minimum, probably to disrupt it entirely.

As the tide of American aerial assault on Germany rose, the precision bombing missions continued to prove their validity in terrific smashes against industrial targets, naval bases and war plants. Some enthusiasts among the arm-chair strategists began to play up once again the doctrine of victory solely through air power. But the men responsible for the planning and execution of precision missions, even while working for still more devastating results, would not permit themselves the luxury of day-dreaming about what might be accomplished eventually with the wonderful weapons still to be designed in a vague future. They knew with exactitude the industrial potential at their disposal and other factors which clearly outlined for them the quantity and quality of the weapons they could wield in a foreseeable future. On such tangibles the responsible strategists built up the ideas and facts of the precision bombing offensive.

Prelude to Invasion

Much too little recognition of the vast extent of damage to key German industries as a result of strategic bombing has been made in our press, including our aviation journals. To be sure, newspaper cables and magazine articles have glowingly reported the pertinent details. But the tremendous importance of striking at the vitals of the Nazi war machine as an element in winning the war most economically and yet with most efficient brevity has been neglected.

If more of the experts and laymen alike would recognize the ultimate goal of American precision bombing of Fortress Europe, they would look upon it with new respect and admiration. It is nothing less than so to dislocate the Germans' industry, their lines of communications, their communications network as to, in the words of General Henry H. Arnold, Commanding General, Army Air Forces, "Make it easy for our ground troops to go in for the final dash and save thousands and thousands of lives —and that is the main objective of this whole effort."

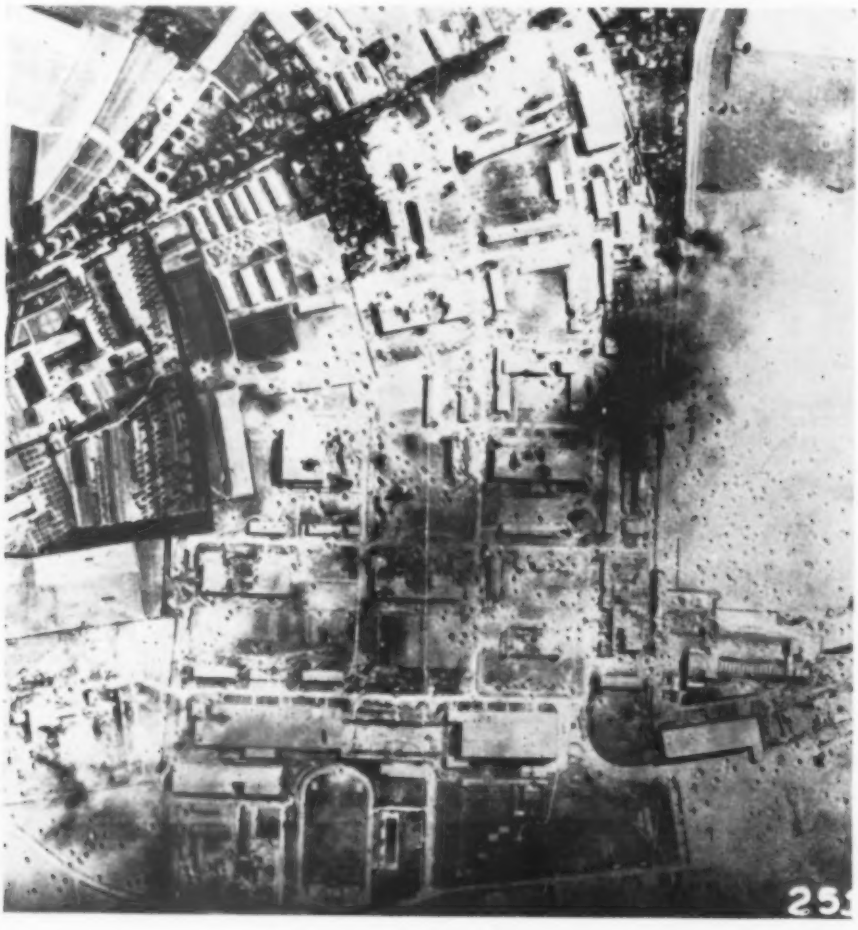
Daylight precision bombing's success does not imply disparagement of the Royal Air Force's night saturation or area bombing which has accounted for the demolition of so vital targets as Berlin, Hamburg, Cologne, Bremen. American air generals have not been chary in acknowledging the value of the RAF operations. Major General Harold L. George, for example, in a London interview brought out the dovetailing of the British and American techniques into an over-all strategic pattern. He said that "to wage a war a nation must possess the will to fight and the means to fight. The RAF is disintegrating their will and we will disintegrate their means."

Are the Air Forces strategists committed to precision bombing exclusively or do they sometimes feel that pattern bombing is desirable? This was a question propounded recently to General Arnold at a conference he held in Washington with a group of editors, writers, and news broadcasters. The General's reply was:

"We can do pattern bombing as well as anybody else. We do pattern bombing sometimes — but pattern bombing is done for a different purpose. Pattern bombing is done more for the breaking of morale of the people, confusion, and that sort of stuff in a community, and for destroying a city, more than it is to knock out any objective, which is what we are trying to do. But the poor fellow who is in a tank outfit and can't get

Destruction of enemy air power has been greatly advanced by the U. S. A. A. F. This photo shows how daylight bombers wiped out a Messerschmitt factory at Regensburg. Heavy damage occurred all over the works, nearly all buildings being affected in some degree. Damaged ME's can be seen.

—(AAF Photo.)



ABOUT THE AUTHOR

ZACHAROFF

Lucien Zacharoff, who wrote the accompanying article, is associate editor of AEROSPHERE, *the international yearbook, and has long been an aviation writer and commentator for American and European periodicals. Of his several authoritative books,* THIS IS WAR! *foretold at the time of the Munich pact the imminence of war and predicted the employment of tank armies, glider trains, paratroops and other "surprises."* (WE MADE A MISTAKE)—HITLER, *which he wrote at the height of the Nazi invasion of Russia, boldly forecast a Russian victory at a time when most observers predicted quick German successes. In demand as a lecturer, he also acts as consultant on post-war economic problems of international air transportation. Future articles by Lucien Zacharoff will bring to* SOUTHERN FLIGHT *readers authoritative and timely treatment of domestic and foreign aviation developments.*

parts for the tank, why, he is going to begin to get a little dissatisfied too. It works both ways."

Industrial Damage Analyzed

The American plan then is clearly one intended to paralyze the whole hostile war juggernaut through cutting its jugular vein which is industrial production facilities. This is being accomplished through pin-point target selection of those enemy installations whose disruption has the greatest effect on the front-line operations. Let's look in some detail as to what is being achieved, and how. A remarkable case in point is the blow delivered by our Eighth Air Force to the giant ball-bearing plants at Schweinfurt. That particular assault is well worth our analysis also because the Americans on that occasion had sustained a loss of sixty B-17 Flying Fortresses, as well as of 593 crew members.

What was the target? It comprised three huge plants in Northern Bavaria, two owned by the Vereinigte Kugellager Fabriken A. G. (VKF) and one by Fischer A. G., often called Kugel-Fischer.

The significance of ball bearings? The Nazi military aircraft, once the terror of Europe, could not operate without those. The average use of bearings is 1,000 for each plane built for war purposes. A modern four-engined bomber uses up to 3,400 ball bearings, smaller planes use 300 to 400.

Also, the intricate machinery essential to the manufacture of ball bearings at Schweinfurt was made for Germany in other countries before the war and hence was practically irreplaceable.

Against this target — which was producing at least half of the ball bearings manufactured in German-controlled Europe, and 75 per cent of those made in Germany itself — the Eighth Air Forces unleashed its celebrated advanced-type daylight attack. When it was over, not only the Luftwaffe combat planes lacked the vital ball bearings, but also the Nazi submarines, tanks, trucks, torpedoes, and other machines.

Since no country has ever considered it practical to maintain any considerable stockpile of ball bearings or has ever had the production capacity to build up such a stockpile, it was manifest that a war-production bottleneck was bound to develop in the Reich as a result of the Schweinfurt disaster. Inasmuch as all high-speed moving parts depend on ball bearings to eliminate friction, the American attack was instrumental in curtailing Nazi operation of machine tools, anti-aircraft, gun carriages, and too many other devices for listing herewith.

—(AAF Photo.)

No more Focke-Wulfs will roll out of this factory at Marienburg, Germany. One of many counter-air force targets of the 8th AAF daylight bombers, it was completely destroyed with uncanny precision hits. Note how bombs were grouped entirely within the building area.

The Schweinfurt enterprise was the fountainhead of a first priority war industry of the Western Axis. Its destruction was typical of what the American plan is — for pulverizing vital objectives, like aircraft factories, submarine pens, synthetic-rubber plants, and other German war-production installations.

American long-range heavy bombers moved in on a city of 50,000, destroying that portion of it which enabled the enemy to wage war against the United Nations. Flying the 1,000-mile round trip in clear weather and broad daylight, the B-17's dropped 485 tons of high explosive bombs and eighty-eight tons of incendiary bombs.

What importance the Germans themselves attached to their ball-bearing industry at Schweinfurt may be gauged by how well they attempted to defend it at the air approaches. The day after the attack it became known that the Americans destroyed eighty-six enemy fighters, probably destroyed twenty-five more, and damaged twelve. Besides, the fighter escort of our bombers accounted for the destruction of thirteen Nazi fighters, probable destruction of another, and damage to five others. Two of our fighters were missing. (P-47 Thunderbolts furnished the fighter escort for the Flying Fortresses part of the way, their range greatly curtailed because the weather for their return to their English bases was doubtful.)

Subsequent reconnaissance photos showed that all the works of the Schweinfurt ball-bearing industry had been completely wiped out or severely damaged. The marshalling yards re-

(Continued on page 44)

INDEPENDENT AVIATION'S TOMORROW

The Fourth Annual NATA Convention last month in St. Louis lost no time getting into the "meat of the cocoanut" by advocating continuation of War Training Service, reduction of red tape and relaxing restrictions on non-scheduled aviation, defeat of the Lea Bill, and a specific outline for immediate post-war aviation expansion and development.

By GEORGE E. HADDAWAY

IN the words of Roscoe Turner, the newly elected president of NATA, "aviation was built on hamburgers and, although I am not as young as I used to be and hamburgers are at their lowest ebb in history, I can eat them again if it proves necessary."

After attending the National Aviation Training Association Convention in St. Louis the first week in December, this observer is convinced that the hamburger era is not likely to return to the aviation business, especially if the thoughts, plans and sincere convictions expressed by the convention leaders have anything to do with independent aviation's "tomorrow".

You can't stop an earthquake, which in this case is a human affair, made up of rugged individualists, finally acting in concert and unity, ready to shake off the chains of restrictive government control and interference.

Appeal for Simplification

Robert H. Hinckley, "father" of CPT, Sperry executive, and former Assistant Secretary of Commerce, sounded the keynote of the meeting when he said: "You can't be free from government control if you won't demand and take responsibility yourselves." Wayne Parrish, ubiquitous and tub-thumping editor of *American Aviation*, likewise hit upon a popular convention tune when he ridiculed the paralyzing influence of over-regulation, bringing the house down with applause when he said he had just seen a man who had never driven anything but a Ford get into a Plymouth and drive away without being checked out.

The outspoken campaign for the simplification of Federal regulation was further augmented by the timely observations of Lt. Col. Earle Johnson, Air Corps, National Commander of the Civil Air Patrol, who sketched the little-publicized but nonetheless remarkable accomplishments of that volunteer organization of the nation's civilian airmen. Johnson's address can definitely be put down as one of the most important contributions in the move to bring harmony and co-operation among the various branches of the aviation family — a healthy trend that was definitely a part of the constructive atmosphere of the entire convention, climaxed by a pledge of NATA "to develop strong ties and closer co-operation with other national aeronautical associations and civic organizations on problems of mutual concern, namely such organizations as the Civil Air Patrol."

Joseph T. Geuting, Jr., chairman of the Personal Aircraft Committee, Aeronautical Chamber of Commerce; Leslie H. Bowman of Fort Worth, outgoing president of NATA, and NATA Director John H. Wilson of Lockport, Ill., who presided at one of the most lively roundtable discussions, also faced the issue of relaxation and simplification of all laws and regulations affecting aviation's progress. We received the impression that NATA is ready to do something about the matter because the organization has grown in stature, its membership is at last truly representative of non-scheduled aviation and can voice the interests of that group.

Name Change Broadens Sphere

The replacement of the word "Training" by the word "Trades" in the NATA name is deeply significant of the organization's growth and expansion. Although NATA has always attempted to represent the best interests of base operators, many felt that it was limited to CPT and later WTS contractors. Consequently the word "Training" tended to restrict both membership and primary interests of the group.

Another significant factor in the St. Louis convention was the participation of the Aviation Distributors and Manufacturers Association, under the chairmanship of Ray W. Snyder, Chicago, who is president of the ADMA. Two score manufacturing and distributing companies had trade booths erected on the mezzanine floor of the headquarters hotel and it was not unlike the aircraft shows in years past that did so much to stimulate trade and promote wide acquaintanceship within the industry.

Bowman Outlines Objectives

In his annual report to the convention, Leslie H. Bowman of Fort Worth, retiring president, reported on the expansion in membership during 1943 and outlined the several funda-

Officers elected at the St. Louis convention include, left to right: Leslie H. Bowman, of Fort Worth, retiring president, chairman of the board of directors; Roscoe Turner, of Indianapolis, president; and Leslie Marsden, Buffalo, N. Y., first vice president.

mental objectives of the reorganized NATA, which include:

"First—To establish a nationally organized association which will invite the participation of every type of non-scheduled and independent commercial aeronautical activity.

"Second—As a national voice for the fixed-base operators, to work with government officials, both federal and state, to develop the aviation resources of the nation to the best advantage of private flying and non-scheduled aeronautical programs.

"Third—To urge the early relaxing of necessary wartime restrictions on civilian flying activities; in particular, to seek to open up civilian flying again in the restricted zones on both coasts; furthermore, to ask that restrictive regulations be lifted to such extent as will be consistent with the requirements of national defense policies.

"Fourth—Looking into the peacetime future, to propose establishing a national program for the furtherance of all sections of non-scheduled civilian aviation in such a way as to serve the peacetime objectives of our own country to the fullest extent; by way of starting the movement under this purpose, to seek a thorough revising of Civil Air Regulations in the simplest form possible, keeping in mind the promulgation of safety as a primary requisite in civilian aviation.

"Fifth—In order to develop ever-improving service to the private and non-scheduled commercial flyer, to undertake the working out of and

(Continued on page 35)

CONVENTION SPEAKERS—Brilliant addresses on all subjects affecting non-scheduled civil aviation characterized the convention sessions. Included in the brilliant array of speakers were, left to right, the Hon. Robert H. Hinckley, Sperry executive and former Assistant Secretary of Commerce for Air; Hon. Jennings Randolph, Congressman from West Virginia; R. McLean Stewart, Director of Training, War Training Service, CAA; Frank Tichenor, publisher of **Aero Digest**, and Wayne W. Parrish, Editor of **American Aviation.**

NATA RESOLUTIONS
(Condensed)

AIR PERSONNEL TRAINING: The present program (WTS) should be continued for the duration of the War, and continued after the cessation of hostilities as an air reserve training corps, and the CPT Act of 1939, as amended, should be further amended to extend the life thereof.

RELAXING RESTRICTIONS ON CIVILIAN FLYING: Military Services and CAA commended for attitude and action in easing of present restrictions; urged further relaxation consistent with national security; suggested that all regulation be simple and easy to understand and kept at its constructive minimum.

ARMY RECOGNITION OF AIR POWER: Commendation of Army for declaring the following principle, which appears in War Department Field Manual 100-20:

"Land power and air power are co-equal and interdependent forces; neither is an auxiliary of the other."

CO-OPERATION ON MUTUAL PROBLEMS: Expressed opinion and convictions of NATA to develop strong ties and closer co-operation with other national aeronautical associations and civic organizations on problems of mutual concern, namely such organizations as the Civil Air Patrol.

AUTHORITY TO ACT ON CHANGING SITUATIONS: The NATA board and executive committee were empowered to take decisive action on all matters affecting non-scheduled civil aviation with particular reference to fixed-base operators; instructed legislative committee to consider all pending legislation and to recommend measures favorable to non-scheduled civil aviation.

DISPOSITION OF SURPLUS AVIATION MATERIAL: Urged Congress to create a special Federal Commission in order that surplus aviation material may be disposed of in a fair and economic manner without chance of developing a monopoly.

PROPOSED CHANGES ON CIVIL AERONAUTICS ACT OF 1938: Recommended (a) that no monopoly or near-monopoly be allowed to develop in domestic air transport and (b) that air traffic and air safety always be functions of Federal authority.

H. R. 3420 (LEA BILL): Against bill in present form and requests to be heard on this bill and any other measures affecting aviation before enactment thereof.

LANDING FACILITIES AND SMALL AIRPORTS: Detailed urgent need of small airports and landing strips for expansion of all flying in postwar era; that the construction of landing strips adjacent to Federal and State highways should be assigned to properly qualified and authorized state agencies.

DECLARATION OF NATA POLICIES: 1. Asks CAB to act now on preliminary steps to grant certificates for airline extensions, particularly "feeder lines." 2. Revive the Civil Pilot Training program and place in high schools. 3. Revise CAR 24 so that returning mechanics and technicians from military services might be Federally certificated and in order to establish new A & E certification system for CAA approved schools before the Veterans Administration launches into large-scale training of demobilized veterans. 4. Requests that as soon as victory appears safe, aircraft manufacturers be permitted to build aircraft for civilian uses and that short-haul airline operators be permitted to engage in transportation of mail, freight and passengers on many "test" routes. 5. Expresses opposition to the entry into any division of the air-transportation business of inexperienced operators or by surface transportation companies or corporations.

HINCKLEY

RANDOLPH

STEWART

TICHENOR

PARRISH

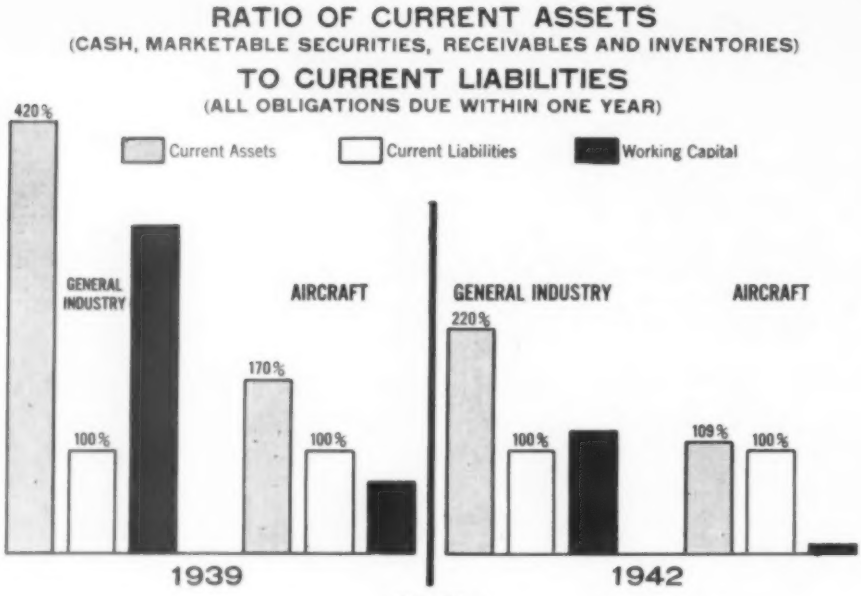


CHART 1

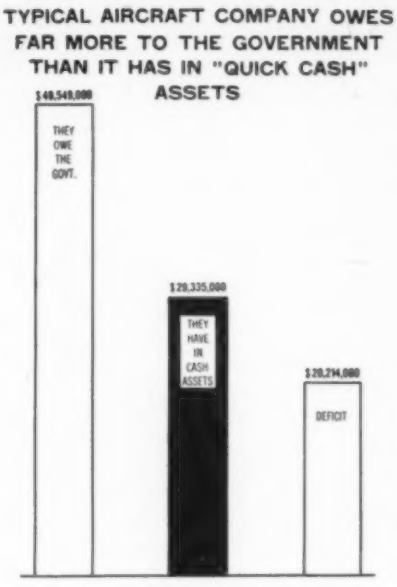

TYPICAL AIRCRAFT COMPANY OWES FAR MORE TO THE GOVERNMENT THAN IT HAS IN "QUICK CASH" ASSETS
$48,549,000
THEY OWE THE GOVT.
$29,335,000
THEY HAVE IN CASH ASSETS
$20,214,000
DEFICIT

CHART 2

Congress Can Prevent
AVIATION BANKRUPTCY

(EDITOR'S NOTE: *The precarious financial position of the aircraft industry has been known for some time. But the clearest statement of facts, illustrating how close to bankruptcy the industry will be on the day the war ends, was not made until last month. It was presented before the Senate Finance Committee by Lucien W. Shaw, assistant to the president of Lockheed Aircraft Corporation, who appeared on behalf of the hundred-odd member companies of the Aeronautical Chamber of Commerce. Mr. Shaw's views, including the findings of the Harvard School of Business Administration after a recent survey, as well as recommendations of the industry as to how the hazards may be lessened by congressional action, are published here to stimulate wider interest in the industry's crisis.*)

By LUCIEN W. SHAW

★

PRODUCTION of aircraft in the United States has expanded phenomenally. Both the rate of growth of the industry and its present size far exceed that of any industry the world has ever known. In 1939, output was approximately 200 million dollars. The 1943 output of the prewar aircraft manufacturers represented by the Aeronautical Chamber is about sixty times 1939, or approximately twelve billion dollars. In 1944 it will be a substantially greater amount. By comparison the all-time peak for automobile production was less than four billion dollars. In October, 1943, alone, two thousand more military aircraft were produced than in all of the year 1940.

To accomplish this production it is estimated that the peak employment requirements of the manufacturers of airplanes, airplane engines and propellers will be 1,650,000 employes, as compared to approximately 44,000 on January 1, 1939. In addition, the many subcontractors and suppliers, who are of the highest importance in maintaining aircraft production, are estimated to require over 1,400,000 employes, making a total for the entire industry of over 3,000,000.

This enormous expansion has placed the aircraft industry in a position of extreme hazard at the conclusion of the war. The financial problems which we will then meet will be so serious that there are no adequate measures which our individual companies can take to protect themselves from possible disaster.

To explain the situation can best be done by presenting in summary form certain data recently presented by the Harvard School of Business Administration in a booklet entitled "Financial Position of the Aircraft Industry." I would like to summarize a few of the facts which the bulletin presents.

In preparing the study, Harvard obtained from eleven major aircraft manufacturers their audited financial figures for 1942 (the latest which are available) and earlier years. These eleven companies represent over three-fourths of total war-plane construction in the United States. By dividing the totals of the financial figures by the number of the companies represented, Harvard obtained figures for an "average aircraft company" typical of the industry.

Weak Financial Condition Emphasized

The most startling fact developed by the Harvard study is the very small margin by which current assets in the aircraft industry exceed current liabilities. Current assets, of course, mean cash, accounts receivable, and inventories. Current liabilities include amounts owed to employes for wages, to suppliers for material and parts, and to the Government for taxes, renegotiation refunds, advances, and progress payments received against expenditures on war contracts. Chart 1 shows that at the end of 1942 the typical aircraft company had only $1.09 of current assets for each dollar it then owed. On the same date the average for non-aviation industry corporations, selected as typical companies by Harvard for comparison, was $2.20 of current assets for each dollar owed. In other

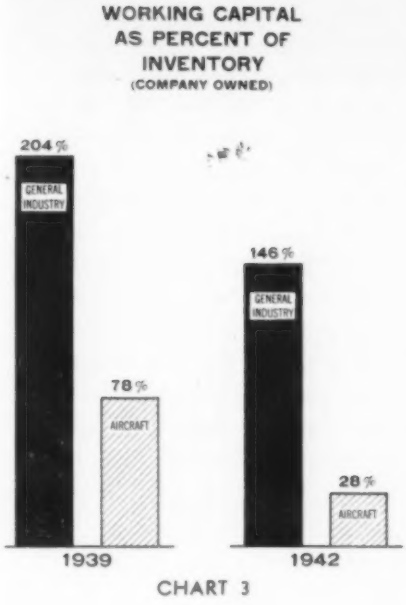


CHART 3

words, the aircraft companies have only the very narrowest margin or cushion of funds and inventories to meet immediate obligations. Obviously, any shrinkage in the value of inventories, for example, even in a minor amount, would make the industry unable to meet its debts.

Furthermore, the quick cash assets (cash and marketable securities) of the typical aircraft company are far short of the amount required even to pay debts to the Government for taxes and renegotiation. Chart 2 shows a deficit in quick cash assets of over twenty million dollars for the typical aircraft company.

Chart 3 shows that the working capital of the typical aircraft company is only 28 per cent of its inventory as compared to 146 per cent for an average non-aircraft industry company and as compared to a ratio of 78 per cent for aircraft companies in 1939.

Chart 4 shows that an 8 per cent decline in the value of the total assets for which the eleven aircraft companies are responsible would wipe out the stockholders' capital. It also shows that an 11.6 per cent decline in the value of inventory for which the companies are responsible will wipe out working capital.

We are seriously concerned as to the huge amounts of inventory for which our companies are responsible. The risk of loss upon termination of contracts with respect to inventories is very great. The reasons for this are well set forth in the Harvard study:

"The average company had expanded its production twenty-fold in a period of three years, and under conditions which made it necessary to subordinate all other considerations. The control of inventories has been hampered by such factors as frequent design changes, schedule changes, sudden shifts in the demand for spare parts, a high labor turnover, inexperienced clerical and supervisory personnel, and frequent rearrangements of factories and warehouses.

"All these factors have had an effect on the ability of the average company to maintain inventory records comparable with those which would be kept under normal peacetime conditions. For example, few if any of the major war-plane manufacturers take a physical inventory at their fiscal year end, for such inventory-taking would involve a slow-down of production. Any simultaneous physical checks on all work-in-process are impractical in view of the vast numbers of parts and the interference with production which would be involved. Although the companies do usually employ a crew of men who make a continuous count of raw material items throughout the year, the difficulties of maintaining controls comparable with normal peacetime standards are great.

"Appreciable amounts of obsolete or surplus materials tend to accumulate in inventories under such conditions."

As shown in Chart 5, another alarming fact with respect to the condition of the industry is that the typical company has working capital sufficient to pay wages, salaries and material expenses at wartime levels for only two weeks.

Furthermore, as shown in Chart 6, cash and equivalents on hand of the aircraft industry are sufficient to pay expenses of operation for only five weeks.

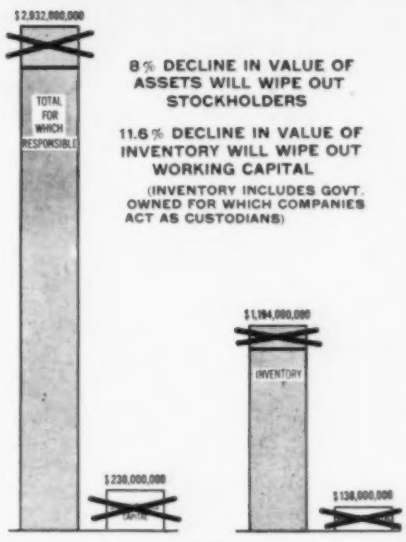

THEY CAN GO BROKE!
$2,932,000,000
TOTAL FOR WHICH RESPONSIBLE
8% DECLINE IN VALUE OF ASSETS WILL WIPE OUT STOCKHOLDERS
11.6% DECLINE IN VALUE OF INVENTORY WILL WIPE OUT WORKING CAPITAL
(INVENTORY INCLUDES GOVT. OWNED FOR WHICH COMPANIES ACT AS CUSTODIANS)
$1,194,000,000
INVENTORY
$238,000,000
$138,000,000

CHART 4

Why Aircraft Industry is in Unsound Condition

The foregoing figures show the reason that aircraft people are concerned about their ability to survive at the end of the war. You will probably wonder as to the reason which has brought about such a result. The basic reason is the huge volume which the industry has undertaken, coupled with existing controls imposed upon war profits by the income tax structure and by renegotiation.

Our tax structure, and to some extent, renegotiation, has been based on the theory that prewar earnings and invested capital are the proper measures to determine reasonable war profits. In many instances this is proper. However, it does not take account of the great risks resulting from

(Continued on page 50)

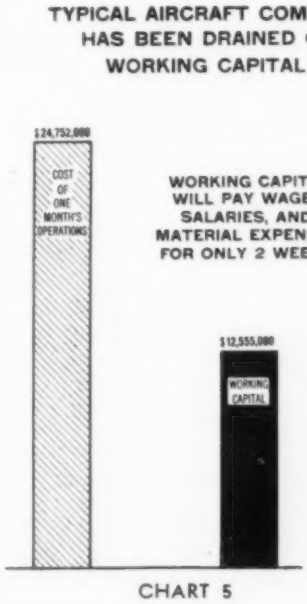


CHART 5

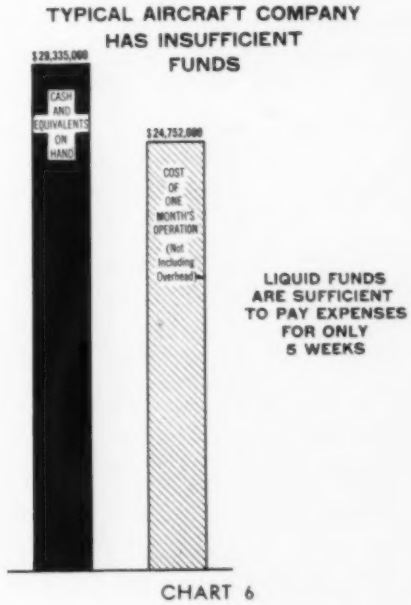

TYPICAL AIRCRAFT COMPANY
HAS INSUFFICIENT
FUNDS
$29,335,000
CASH AND EQUIVALENTS ON HAND
$24,752,000
COST OF ONE MONTH'S OPERATION (Not Including Overhead)
LIQUID FUNDS ARE SUFFICIENT TO PAY EXPENSES FOR ONLY 5 WEEKS

CHART 6

—(Claude E. Howell Photo.)

Ingenious time-savers evolved by civilian contract schools are giving Uncle Sam more military pilots despite shortages in equipment. The refueler at left deposits helper and hose quickly and efficiently onto motor cowling without the use of ladders, hose lifting and securing and the like. Tex Rankin, the noted aerobatic champion, now operating a school at Tulare, Calif., thought up this one.

Speed-Up Solves Shortages FOR CONTRACT SCHOOLS

By CHARLES H. WILLIAMS

★

MEN who give wings to the nation's warhawks, operators of sixty-three Army contract flight schools in the United States, received a rude jolt some months back when Uncle Sam curtly notified them that their already overtaxed institutions henceforth would have to turn out considerably more pilots without additional facilities.

"We've got to have more airplanes," the contractors protested. But there just weren't any more airplanes to be had. So these fellows who furnish primary flying instruction to all Army cadets, displaying the sort of determination and resourcefulness that has characterized the contract flight-training program from its inception in the dark days of 1939, set to work to accomplish the impossible and did it.

The story of how they did it was told recently at the Army Air Forces Contract Flying School Conference in Dallas, at which Lieut. Gen. Barton K. Yount, commanding general of the AAF Training Command, paid tribute to the magnificent contribution of the flying school industry to the war effort.

It was told by three outstanding leaders of the air-training industry, J. G. (Tex) Rankin, Beverly E. Howard and Earl D. Prudden, who related in a discussion of "Flight Operations" how the schools which they head found ways of "cutting corners" and increasing efficiency to carry the heavier load. This article, based on the talks they gave and interviews with the three flight school operators, explains how the air-training industry met its crisis.

Rankin, veteran airman and holder of the world's aerobatic flying championship, heads Rankin Aeronautical Academy, Tulare, Cal. Howard, one of the nation's top stunt pilots, is president of Hawthorne School of Aeronautics, Orangeburg, S. C. Prudden, rated as one of the most skillful directors of flying instruction in the country, is vice president and general manager of the Ryan School of Aeronautics at San Diego, Cal.

How Speed-Up Works

When the Army dropped its bombshell into the primary air training program, Rankin, Howard and Prudden and other top-flight operators determinedly set about to find ways of cutting time in every possible operation. Before the order came, they had felt their schools were being run as efficiently as possible. But when they and their key men began closely scrutinizing each operation singly, they discovered to their surprise that the time required for nearly every operation could be reduced appreciably by ingenious shortcuts, better discipline and more efficient equipment. After ways had been figured out to shave time in the various single operations, the improved systems were tried out with amazing results. The Ryan School of Aeronautics, which operates schools at Hemet, Cal., and Tucson, Ariz., by adopting the speed-up system, was able to increase flight-hours per plane per day from the old average of 4½-5 hours to a new average of 7½ hours. Rankin, Hawthorne and other resourceful and enterprising schools met with similar success. Other flight academies heard of the improved systems and adopted them with the freely given assistance of the competitors who devised them. Commercial rivalry does not exist in the cadet training program and the primary school contractors work as one team bent upon

a single purpose — victory in the quickest possible time.

Following is a summary of some of the most important shortcuts, which are listed numerically for simplification and brevity. It is impossible to give individual schools credit for developing these time-savers, for many were put into effect by several institutions almost simultaneously and there is no way of determining which was first:

1. Improved gas trucks: Overhead booms on gas trucks speed up fueling of airplanes. On the truck developed at Rankin, the boom swings sideways and clears the PT-17 Stearman engine. It is operated by a crew of two, driver and fueling man. The truck is driven down the line of parked airplanes. At each stop the fueling man steps off a platform onto the cowling, unscrews the gas tank cap, swings the boom over, inserts the nozzle and fills the tank. This system cut time required for gassing in half.

2. Public address system: Loud speakers on flight line and in ready rooms at Ryan and other schools prevent loss of time in notifying students and instructors that they are to fly next.

3. Binoculars: Tower dispatchers use binoculars to determine the numbers of planes coming in to land and notify next cadet assigned to that plane in time for him to be ready and out on the mat waiting to climb in the instant it stops.

4. Tug cars: Small towing cars, (converted Ford Model A's are excellent for the purpose) tow airplanes to and from flight line and maintenance hangars, eliminating cranking and taxiing. Use of tug cars saves time and gasoline and reduces accidents.

5. Flood lights: Rankin has installed proper lighting so that planes can be preflighted before dawn and every thing made ready by daylight.

6. Production - line maintenance: Use of a production-line system has speeded up and increased efficiency of maintenance department. Motorcycles and motor scooters enable mechanics at Rankin to go from hangar to hangar quickly. Mechanical departments have been streamlined. More handy electrical plugs have been installed. Great study and care have been used to improve every facility in any way possible and time cut from many little details of operations have added up, in the final analysis, to a marked increase in maintenance efficiency.

7. Improved wind tee: Rankin Academy has installed a powered arrangement on the large wind tee located in the center of the school's two mats so that the tee can be changed with the wind from the control tower. Before this, it was necessary for someone to drive across the field and move it by hand.

—(Dallas Aviation School Photo.)

Public address systems at Army contract schools expedite the handling of planes on the flight line, allow more hops per unit. Here's a dispatcher at one of the Texas schools operated by Major W. F. Long's Dallas Aviation School.

8. Safety Awards: Hawthorne, Rankin and other schools have promoted safety by posting War Bonds and other prizes for leaders of squadrons with least number of accidents. Accidents are graded by points according to their seriousness.

9. Protecting planes: Hawthorne uses this widely copied system for protecting airplanes from high winds. A dead man anchor is installed for each wing tie-down and tail tie-down, with quick detachable snaps of strong construction. A lock-type wheel chock of metal tubing (one-inch water pipe will do) holds the front wheels rigid. The two chocks are fastened at the end of a piece of tubing the length of which is cut to fit the tire size. This system has prevented damage to planes during severe windstorms at Hawthorne.

Traffic Control Innovations

10. Two-way traffic: Hawthorne, Rankin, Ryan and other schools have speeded up flight operations and increased safety by two-way traffic systems. At Ryan, solo planes take off at one side of the field and turn to the left as soon as they are in the air, while dual planes take off at the other side and turn to the right into the regular traffic pattern. This system cuts take-off time one third at the two Ryan schools. Hawthorne separates the landing airplanes by having cadets take off on the outside of the pattern and land on the inside. This separates the base legs of landing aircraft as far as the boundaries of the field will permit and minimizes the chances of two airplanes gliding in for a landing coming together in their last turn. Pyramidal markers are placed at midway points on each side of the field to separate planes that may be taking off in both traffic patterns at the same time.

11. No favorite planes: At Ryan and other schools, the former practice of reserving certain planes for flight officers has been eliminated. Any plane not in use immediately is turned back into operation.

12. Miscellaneous: Ryan has a flagman on duty at all times to spot-park planes for quick gassing. Rankin has installed stands for serving food and drinks at auxiliary fields and stage houses. A similar stand was erected next to the operations building so that employes would not waste time walking to the canteen. Rankin also has two commissary trailers which can be moved to any spot. Lacking adequate transportation equipment, Rankin Academy built a long "elephant train" trailer seating 100 cadets and towed by a Ford tractor. The trailer hauls cadets to and from the East Mat Stage house, a distance of one mile.

THE Sky's the Limit

BY BILL GREEN

Explaining ourselves . . . . We've owned several planes, done a bit of flying, and like to look around. . . . . Flying costs plenty . . . . Will there be a boom?

Statement of Policy

IN the last several years we have received a good many comments, some adverse and some favorable, on the statements that we have made in these columns. Most of the adverse comments lead us to believe that our readers may not clearly understand what our policy is, and we will at this time make a statement of policy as clearly as we can.

Our policy in writing this column is:

(1) To promote and to defend the American way of living. In order to do this, it may be necessary from time to time to touch on almost every phase of politics, philosophy, industrial and labor relations, engineering, science, sociology, etc. We believe most everyone will agree that it would be difficult to simply build a wall around aviation itself and consider no other problem except those that were 100 per cent aviation problems. To nourish a tree it is necessary to get moisture and food to all the roots, however widely they may be spread.

(2) To promote and defend aviation in all its ramifications. In this regard, we consider the problems as:

(a) Those having to do with the safety of aviation. We will treat this in a later paragraph in detail.

(b) Those having to do with organization, finance and general economy of aviation.

(c) The general dissemination of facts, figures, and philosophy of aviation to the general public.

(3) We shall defend free enterprise and the right of each and every individual to engage in his chosen business or profession to the very last ditch and against all comers.

The first airplane flight that we ever witnessed took place in 1914; in the same year we saw a man make a parachute jump from a balloon; saw him cutting didoes on a trapeze in midair, saw him lose his hold and tumble through the air two or three thousand feet to his death. Our first airplane flight was made in the spring of 1928, and although that isn't early enough to make us by all accounts an old-timer, it nevertheless was quite a long time ago. Since that time, we have been busy worrying about aviation problems and have been so imbued with the feeling that aviation would play a tremendously important part in our lives henceforth that we have devoted a good portion of our time to studying the statistics, accident records, and other data in connection with aviation and American life.

One of the first things that impressed us with aviation was the fact that a great many accidents were taking place and that there was no attempt made by the airline companies or the aviation magazines to acquaint the general public with the reasons underlying such accidents. All newspaper writers created a great mystery about these accidents, and we know for certain that that had a great deal to do with holding back aviation and scaring a lot of people out of using commercial airlines and private plane transportation.

It became necessary for us to do considerable traveling by air in order to save time, and almost immediately thereafter we obtained our own airplane and commenced flying on company business. In 1933 we obtained our license and since that time have owned some fifteen airplanes, and have debunked flying to a good number of people so that they too have become pilots and have purchased their own airplanes. We could make a list a yard long of people who have flown with us for their first time and who have turned around and become pilots —and good ones—immediately thereafter. One of these chaps flew in from the East in his airplane last week and we took time out to talk the business over. Several others are presently in the armed services or are engaged in war work.

Upon a close study of all the records of accidents that have been made available either by the CAA, the CAB, *Air Facts*, the airlines themselves and from personal acquaintances who have been eyewitnesses of some of these accidents, we have gradually come to the conclusion that almost every one of these accidents is due to some pilot error. The CAA shows that of all accidents resulting on airlines or in private flying during 1942, the percentage of accidents charged entirely to pilot error averaged slightly over 76 per cent. The percentage of accidents charged to structural failure was only one-tenth that much, or about 7 per cent. Of the accidents due to structural failure, we would charge two-thirds to pilot error also, inasmuch as practically all of them could have been discovered ahead of time and proper maintenance could have prevented them.

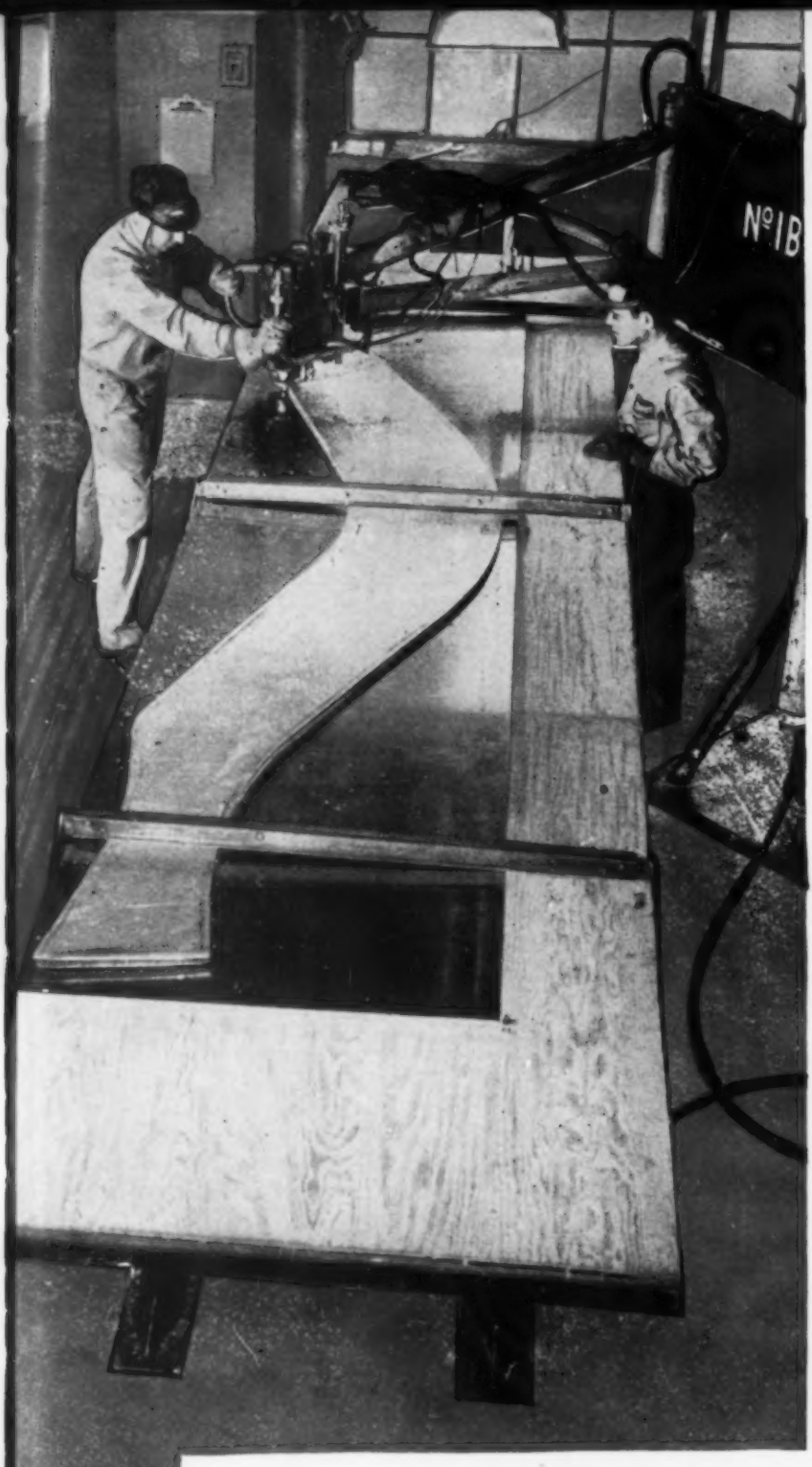
It is, therefore, our thought that from time to time it may be necessary to try to impress on all people dealing with airplanes that caution, plus a thorough knowledge of all these phases of flying, weather, maintenance, etc., are essential to safety in flight.

We will take issue with anybody who thinks he is too smart or too good to listen, since the records show that such people are killing themselves and other innocent people, day after day, all over the country.

We know a great number of people who are worried about these problems, too. We have discussed these things with people in the Army, in the Navy, and in private flying, too. We find that all of them are afraid of the pilots with immature judgment and insufficient knowledge.

The exact figures, of course, may not be given out, but among military pilots losses are tremendous. When a large number of Flying Fortresses fly

(Continued on page 38)



SO YOU CAN SAVE
MANPOWER REYNOLDS OFFERS
A COMPLETE SERVICE ON

FABRICATED PLANE PARTS.

BIGGEST WORRY of war manufacturers today is the problem of getting enough good help. In the airplane industry this situation is particularly acute. It would be worse, except for the fact that Reynolds is saving thousands of man-hours of airplane labor by supplying completely finished parts to *every* leading manufacturer of fighting planes.

Simple and obvious as this service seems today, it has only been available for three years. Reynolds pioneered it . . . built the organization needed to deliver it . . . was the *first* aluminum manufacturer to supply finished plane parts from aluminum sheet.

Every production man knows that the savings are substantial. Besides conserving scarce manpower and valuable floor space at the airplane plant, the Reynolds plan does away with needless handling and cross-shipping of scrap, averaging 30% of every sheet. And this scrap gets back into useful aluminum in three days instead of three months!

The Reynolds organization, now operating 40 plants in 14 states, has been built by this kind of progressive, co-operative thinking and planning. Reynolds men are constantly searching for new ways to make aluminum better, and make it easier and cheaper to use. If you have a problem of *any kind* in working with aluminum, you will find Reynolds has the resources, equipment, and engineering skill to help you solve it in the most practical way. Reynolds Metals Co., Louisville, Ky.

ALUMINUM SHEET of every type is available now at Reynolds plants, ready for quick fabrication into completely finished plane parts of any size and type. Save your own manpower and floor space for the final vital job of quick assembly.

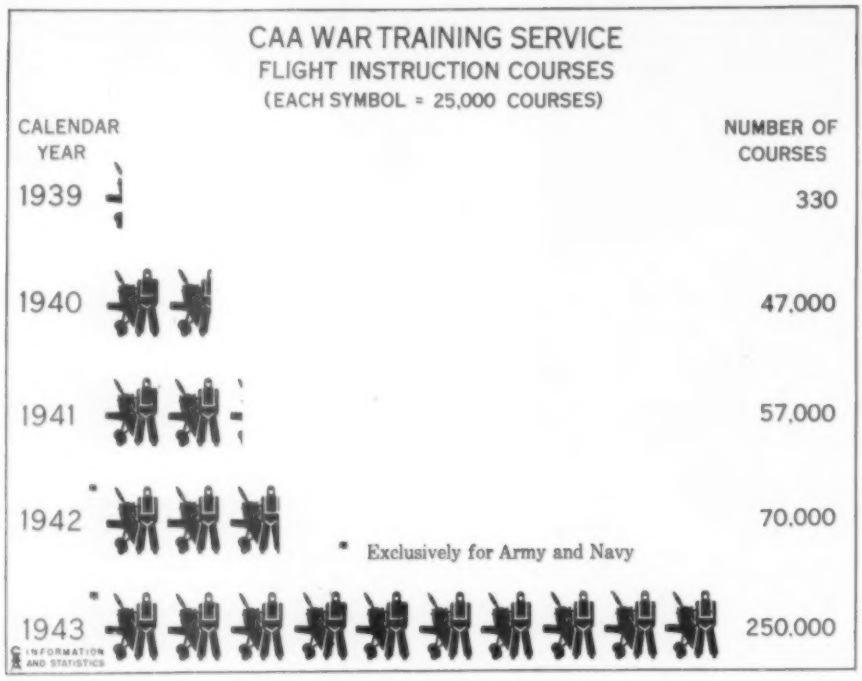
REYNOLDS METAL

REYNOLDS

THE GREAT NEW SOURCE OF

ALUMINUM

INGOT • SHEET • EXTRUSIONS • WIRE • ROD
BAR • FORGINGS • TUBING • FOIL • POWDER



Postwar Planning Topped CAA Work in 1943

Increased attention to postwar planning featured civil aviation developments in 1943, according to Charles I. Stanton, Administrator of Civil Aeronautics.

"We have in aviation a twenty-billion-dollar industry, employing 2,500,000 people," Stanton said in a year-end review. "War has made it our leading business, and while we must continue to concentrate on war activities, the Civil Aeronautics Administration believes the time has come to plan for minimizing the inevitable curtailment that peace will bring."

"With proper planning, aviation will come out of the war far bigger than when it entered. We had 25,000 civil aircraft in 1939. Three years after the war, we should have 300,000, and by the end of the first postwar decade, 500,000."

Airline service to small cities, revolutionary air-traffic-control devices, and a greatly enlarged airport system are among the postwar possibilities explored by the Civil Aeronautics Administration during the year, Stanton said.

Major activities of the CAA in 1943 necessarily were devoted to projects directly serving the armed forces. These included $400,000,000 defense airport program; operation of 35,000-mile airway system on which 85 per cent of the traffic was military; engineering, factory, and flight inspection of military transports and other non-combat planes; and flight training of more than 200,000 men for the Army and Navy.

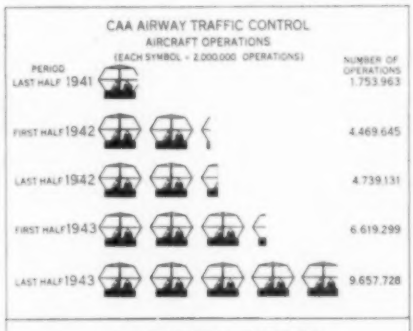
The CAA airport program during 1943 increased the number of U. S. landing fields suitable for transport aircraft from 660 to 940. The number of such fields at the end of 1940, when the CAA program was launched was 94. In all categories, the United States now has about 3,000 airports, compared with approximately 2,500 two years ago.

For the early postwar years, Stanton estimated a need for double our present number of airports. Reaching such a total of 6,000 fields, he said, might cost approximately $800,000,000, an expenditure equal to the entire present investment in U. S. airports. He proposed a Federal aid system of financing such construction, similar to the procedure followed in road building.

Traffic along the Federal Airways built and maintained by CAA increased heavily, largely because of military activity. There were 16,277,027 aircraft operations reported in 1943 to the CAA centers which control traffic on these aerial highways, compared with 9,208,776 operations reported in 1942.

Radar Application Studied

As traffic began to approach capacity on certain busy sectors of the airways, CAA personnel intensified study of new control devices, including electrical boards for automatic posting of flight progress reports; omni-directional radio markers, which send out signals in all directions as distinct from conventional radio range stations which emit signals in four set courses for planes to follow; electronic anti-collision devices by which pilots will be able to see on their instrument panel



the location of all planes within the danger zone around them.

Despite heavier loading and greater utilization of airline planes, safety records grew. Number of miles flown per fatal accident in domestic air carrier operations reached an all-time high of 46,560,835 in 1943, against 22,020,572 in 1942.

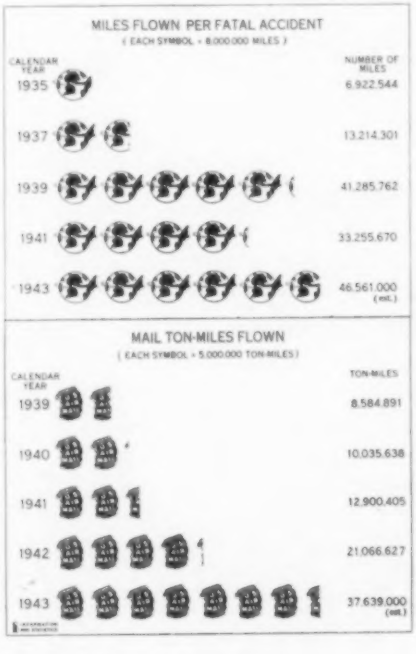
Citing the work of CAA inspectors as an important factor in air safety, Stanton revealed that during 1943, more than 10,000 new aircraft were inspected at the factory by CAA representatives, flight-tested, or both. Airmen examined for certificates of competency included more than 18,000 would-be private pilots, 15,000 commercial pilots, 9,500 flight instructors and 9,000 engine mechanics.

The CAA War Training Service gave approximately 250,000 flight courses during 1943 to Army and Navy cadets. Part of this vast increase over the 1942 total of 70,000 can be attributed to the inauguration of CAA ten-hour flight indoctrination courses for all Army cadets during their college training. Previous CAA courses had been at least thirty-five hours in length. Full-length elementary courses continued to be given in 1943 to about 25,000 Navy cadets, and full-length elementary and advanced courses to 7,000 Army personnel slated for duty as instructors or service pilots.

The number of pilots holding CAA certificates increased from 110,510 in 1942 to 124,050 in 1943. This increase includes both new military pilots who chose to obtain civilian certificates, and civilians who trained for essential flying jobs such as instructors, or members of the Civil Air Patrol.

Airline activities increased, although by the beginning of 1943, the Army had requisitioned about half of the 359 planes in prewar service. Through fuller loading and more intensive use of the remaining planes, revenue passenger-miles rose from 1,398,024,146 in 1942 to 1,505,264,230 in 1943; air express from 40,102,000 pounds in 1942 to 61,366,000 in 1943 and mail-ton miles from 21,066,627 in 1942 to 37,638,833 in 1943.

Possibilities of extending airline service to many smaller cities were outlined by Stanton in testimony at hearings of the Civil Aeronautics Board. Declaring that the short-haul market "represents perhaps the largest chunk of travel business potentially available to our domestic airlines," he pointed out that only fifty-two of the 122 cities of 25,000 to 50,000 population have direct air service, and only fifty-eight of the 413 communities in the 10,000 to 25,000 population bracket.



AVIATION'S TOMORROW

(Continued from page 27)

putting into effect a system of standards, or a code of practices, for the operation of aircraft sales and service bases; this code or set of standards to be continually improved for the encouraging of private flying and the popularizing of all aeronautical activities that seek to interest the private citizen."

Urge Small Airports

Mr. Hinckley, in his four-point proposal for the expansion of civilian aviation, emphasized the need for landing facilities and navigational aids and urged that landing strips in great numbers be constructed along highways and in recreational areas such as national and state parks. Stressing the need also for aviation education in elementary and high schools as well as an expansion of college aeronautical programs, the former Assistant Secretary of Commerce for Air maintained that if we are successful in achieving these objectives, no one needs to fear for the future of aviation in this country.

"The gloomy prophets of little faith would have us believe that private flying will never amount to much because flying is too expensive, too risky, too useless, too this and too that. I grant that there are many things that kept people out of the air in the past —but I say to you that in the future these things need not and will not continue to hamper aviation's growth," Hinckley continued.

He further stated that the private airplane manufacturer must receive every possible encouragement in developing and producing aircraft for the great personal aircraft market, because with safer, easier-to-fly, more useful airplanes, the more flying there will be. "And that's our ultimate aim," he said.

Air-wise Congressman Jennings Randolph of West Virginia spoke at the annual banquet and also urged the highway-landing strip program be pushed to the limit. In his opinion no airport program should be considered by any town or city unless it was tied in with arterial highway construction programs so that time from airports to the heart of our cities might be cut to a minimum. Deploring the "johnny-come-latelys," who, he said, are getting thick around Washington, Randolph urged that Federal aviation administration be taken out of their hands and turned over to aviation experts. He also touched upon the subject of refining aviation fuels from coal and told of his flights with Major Art Hyde, CAP, using the coal extract instead of gasoline.

Lea Bill Pummeled

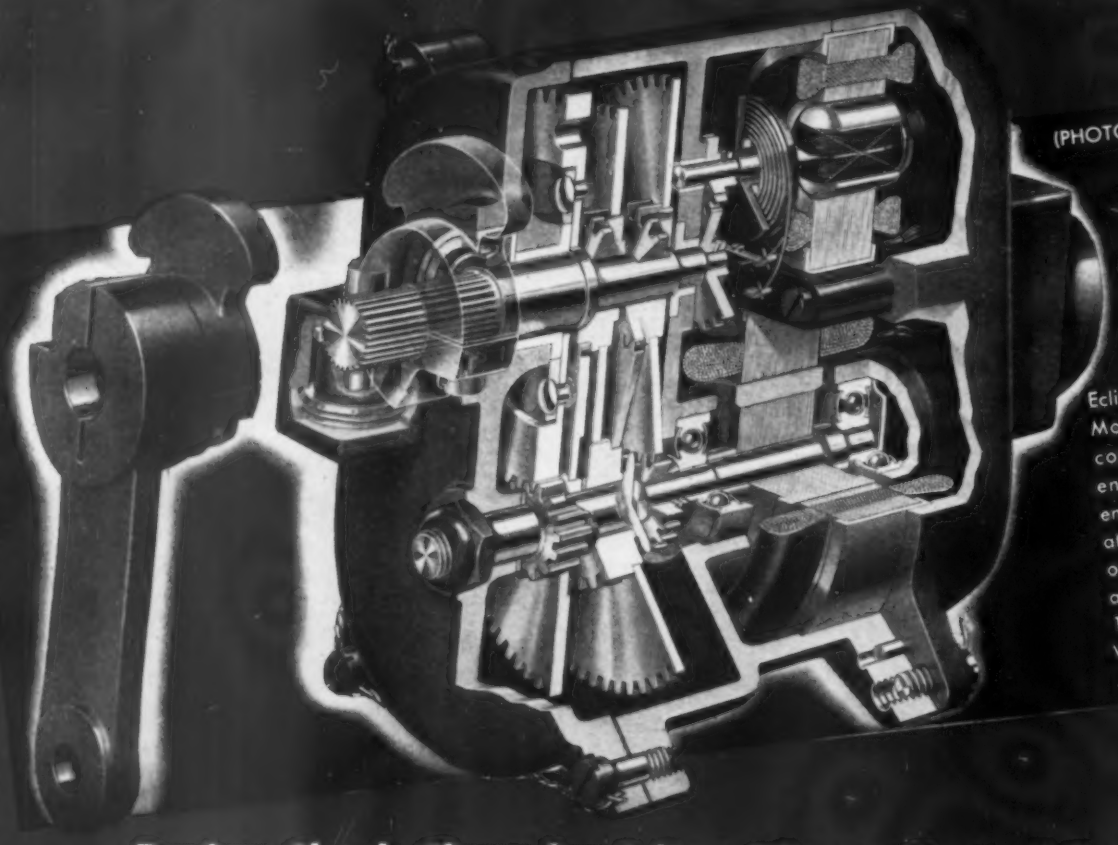
About 95 per cent of the delegates, registrants and visitors at the convention were violently opposed to the Lea Bill and a resolution was passed to that effect with the added request that NATA representatives be called upon for hearings before the bill or any similar measures are enacted. Roy Watkins of Chicago, executive vice president of the Howard Aircraft Corporation, made a vigorous appeal to sidetrack the Lea bill on the ground that it will endanger the future of flyers now fighting on the battlefronts and that the great mistake being made is in confusing and intermingling personal flying with transport flying. "If the present unnecessary urgency for legislation dies down for a while," Watkins stated, "they will see this situation more clearly and bring about a division of aviation into the several fields where it belongs. The idea of dumping all aviation into one basket is just about parallel to putting Buick and Chrysler under the Interstate Commerce Commission because the Pennsylvania and the Santa Fe railroads are there."

Watkins praised the airlines and said we should give them everything they

(Continued on page 48)

AIRCRAFT SERVO

Provide Individual, Remote, Coordinated



(PHOTOGRAPH ACTUAL SIZE)

Eclipse Engine-Control Servo Motor provides accurate control of aircraft main engine, assuring efficient engine performance. Rated at 45 inch pounds torque—output shaft speed 5 RPM—arm travel 90°—power input 15 Watts continuous—30 Watts under load—400 cycle AC—weight 2¼ lbs.

Design Check Chart for Eclipse* Servo Control Systems

APPLICATION

Eclipse Servo Control Systems consisting of Servo motors, autosyn transmitters and amplifiers, all interconnected, can be designed to operate from power source of aircraft—now in production or undergoing design—to provide remote, automatic, coordinated control of aircraft main engines, elevators, rudders, flaps, aileron control surfaces, or any other function requiring positive straight line or rotary motion with or against opposition to effect an accurate adjustment.

Consultation with Eclipse engineers on the requirements of your particular Servo Control System application is cordially invited.

PERFORMANCE

Accurate and positive remote adjustments of exacting flight functions can be obtained. Performance ratings of Servo Control Systems depend on specific application.

DESIGN FEATURES

Eclipse Servo Control Systems eliminate mechanical or hydraulic linkage, providing flexibility of application and installation.

Complete synchronization of two or more systems is possible through autosyn controls.

No complicated switching, special relays, potentiometers or motor brushes.

Complete systems are comparatively light weight and current consumption is negligible.

*TRADE MARK OF BENDIX AVIATION CORPORATION

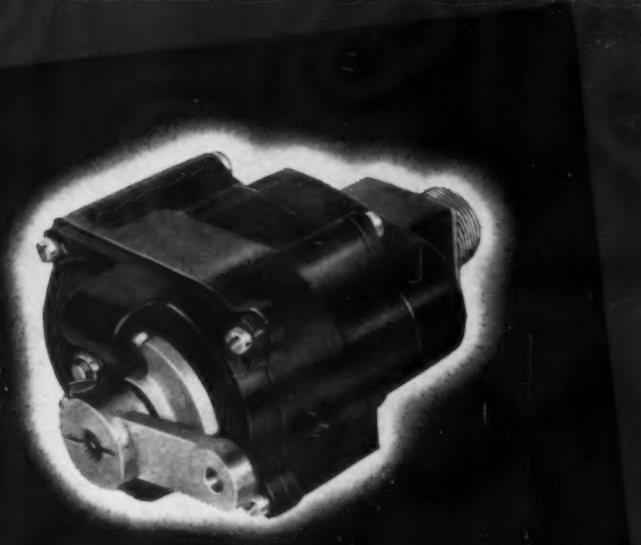
ECLIPSE

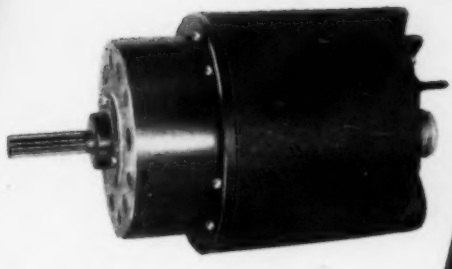
Eclipse AVIATION

ECLIPSE-PIONEER DIVISION

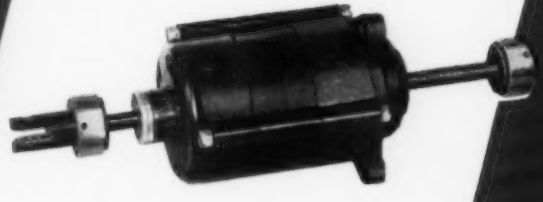
CONTROL SYSTEMS

Control of Aircraft Flight Operations





Eclipse Servo Motor for applications requiring coordinated adjustments of aircraft-controlling surfaces.



Eclipse concentric screw-type Servo Motor provides positive straight line motion permitting exacting straight line adjustments.

Eclipse Servo Motor for applications where rotating adjustments are essential.

THE INVISIBLE CREW

Precision Equipment by

Aviation Corporation

ACCESSORIES

Teterboro, New Jersey

THE SKY'S THE LIMIT

(Continued from page 32)

over Europe and are attacked by German aircraft in droves, and we lose sixty planes with about 500 men, that becomes a subject for a congressional inquiry. Few people realize that we lose more than that many military aircraft, and more than that many airmen each month in accidents that could be avoided. Those accidents take place here in the United States where no one is shooting and where, as yet, they have accomplished no good for the world, the United States of America, the taxpayers, or themselves. We feel that anything that can be done to prevent an accident, the loss of life, or the loss of an aircraft in this country at this time is well worth our and anybody else's effort. We shall therefore continue to present as many facts as possible and as many suggestions as we can.

Strangely enough, we do not make our living from aviation. We have no aviation job, and therefore we have no jealousy or competitive spirit in that regard. On the other hand, we can look critically upon all phases of aviation, and we can have certain ideas with regard to what we observe. Naturally, it may appear to some that we are extremely egotistical in presenting observations that we have more or less casually obtained. However, we present such observations only in an attempt to be helpful and in the thought that frequently some people are so close to the woods that they can't see the trees.

* * *

How Expensive Is Flying?

Any one prognostication is bound to be inaccurate in certain details, and in fact could be completely haywire. However, we have been thinking very hard for many months about the future of industry and of aviation and we would like to present some of our notions to you. Let's just examine this thing for a moment. The average airplane that will perform to any extent costs at least $3,000.00. If we were to assume that this airplane would fly 3,000 hours, the depreciation charge per hour would be $1.00. (Very few private airplanes have ever done 3,000 hours; therefore this is a conservative figure.) Such an airplane usually consumes about five gallons of gasoline per hour, or $1.25. It might use one quart of oil which would amount to 35 cents. Now let us assume that the average private pilot after the war might use his airplane fifteen hours per month. That figure is something less than our own experience, so might be reasonable. Fifteen hours at $2.60 per hour as above set out, would be $39.00 per month. We presently pay and always have averaged about $20.00 per month for hangar storage and would require a thirty-hour check each two months at $15.00, including oil changed, which would amount to $7.50 per month. Every two years there would be a major overhaul which would cost at least $500.00 or $250.00 per year, or about $20.80 per month. In addition there would have to be two 100-hour checks per year which probably would run $100.00 or about $8.35 per month. These figures total then $95.45 per month as the operating and depreciation expense on one airplane costing $3,000.00. This would be something like a Culver or Stinson TC-A, or Monocoupe. These figures do not include any depreciation or maintenance on radio equipment, extra instruments, etc. If you have those, you would find the bill would run something over $100.00 per month total. Now if this airplane were to be one with something over 150-hp engine instead of 80 or 90, you could multiply all the figures by two. If the airplane were to have something over a 300-hp engine in it, you can multiply these figures by three or more.

Having spent $95.45 per month, our private flyer of today or of the future still has not been able to get to the airport or back home or get from other airports to town and back. Therefore, to the cost of flying must be added a few more little trifles, such as owning one's own automobile, which seldom costs less than a nickel per mile to operate; and since airports average about ten miles from town, that would be $1.00 per round trip, assuming the automobile was not used entirely to go to and from the airport. To fly fifteen hours per month would require six to eight trips to the airport, which would be $6.00 to $8.00 more to add to this thing. (At this time it would be well to note that we have not foreseen any accidents, breakage of parts, unusual repairs, etc. Almost every airplane company sends out modification bulletins from time to time and these invariably add a good many dollars per year to the other normal cost.)

We are not building up these figures to discourage people from owning airplanes; we are simply leading up to a discussion of how many people can own airplanes of the present general type and horsepower.

We believe that no one except fanatics (and we agree that there are a number of fanatics in the aviation game) would spend as much as one-third of their salary for aviation exclusively. Therefore, it seems that most anybody who would be willing to spend as much as one-third of their salary would have to be making at least $300.00 per month, after taxes, etc. In the first place, comparatively few people normally make $300.00 per month; but in the second place, most people could not afford to dedicate more than 15 per cent of their salary to aviation unless it were paid for by business. This would mean then that the average person who would be able to spend 15 per cent of his income on aviation would have to be making in the neighborhood of $500 to $600 per month and that would be $6,000.00 to $7,200.00 per year. A few days ago I asked the local bank what opinion they had as to the number of people in any large city whose income would exceed $6,000 per year. They said less than one-half of 1 per cent. That would mean that in a prosperous and good size town, at the very outside there might be 500 people who would be making $6,000.00 per year. According to some statistics that we dug up for ourselves, you probably could not normally expect over 25 per cent of those 500 people to own airplanes of any category. Twenty-five per cent of 500 would 125. Therefore, in a city of 100,000, which would be extremely prosperous and would have 500 people making over $6,000.00 per year, one might expect 125 airplanes to adorn the local airport.

There will be those who will instantly rise up to say: "Well, everybody is going to make more money and besides that, airplanes are going to be cheaper." We mentioned last month and some very learned authorities, including Mr. Mac Short, of Lockheed, have said that airplanes are not yet mass-produced nor has any consequential development been made along the lines of mass production of airplanes. The way we get more airplanes is by using more people in the production lines. It therefore seems to me that airplanes may not be much cheaper. Let us, however, for the sake of argument consider that someone may after the war develop the kind of airplane we are talking about; that is, 80 to 90-hp cruising ability of from 120 to 150 miles per hour, carry two people, use five gallons of gas per hour, etc., and sell for $2,000. This would reduce the $39.00 figure first mentioned above to $34.80. This will not materially change the other figures and therefore would make very little difference.

We should keep in mind that at the beginning of this war we had had a good many years of trend toward fewer working hours per person. If you will remember, it was the average

(Continued on page 40)

The Stars—always the wonder of the human race—have more than ever become a guide and a savior to man in this War, though they are largely eclipsed in our thoughts by the sciences of the Earth and the Air.

Celestial navigation—for centuries the guiding protection of mariners—is now guiding our Bombers and Air Transports over thousands of miles of trackless ocean and uncharted wilderness, day and night, with uncanny accuracy.

Thorough training in the science of the Heavens is as important to our long-range Air Navigators as their training in the use of compass, radio and instruments. Like the Pilots who fly them, these navigators receive much of their air training behind reliable engines built by Jacobs.

JACOBS AIRCRAFT Engines

POTTSTOWN, PENNSYLVANIA, U. S. A.

THE SKY'S THE LIMIT

(Continued from page 38)

in 1932 to work forty-eight hours per week. Many firms worked fifty, fifty-two and even sixty hours per week. By government edict, we first cut to forty-four hours per week. After a year we cut to forty hours per week, and it was proposed next to go to thirty-six hours per week per employe.

Let us assume that no one is forced to cut salaries or wages at the conclusion of the war, but would be forced to prorate such salaries and wages over the normal number of working hours which presently is forty, and gradually reduce the number of hours permitted to each employe in order to utilize all the employes some of the time rather than casting them loose upon the world. It is our thought that eventually all industry would be forced to reduce all the employes to a maximum of a thirty-hour week. At $1.25 per hour, which is probably average, thirty hours per week would result in a weekly wage of $37.50. This would make an average earning for the higher paid people of around $162.00 per month. We believe that a great many executives who are receiving more than $6,000.00 or $7,000.00 per year now would likewise have to be cut in order to keep them on the payroll. Therefore, we are wondering where people who run around prattling about the tremendous postwar development of private aviation will get their soap.

★ ★ ★

Will Aviation Boom?

We see where Portland, Oregon, expects to spend $76,000,000.00 in the two years following the war in a made-work program which will partially take care of the people they expect to be dumped back upon them without jobs. We know that Tulsa, Oklahoma, and practically every other city in the country is expecting somewhat of a similar situation, and therefore we can not for the life of us figure how this tremendous boom is going to take place. We certainly think that it deserves sober consideration.

At the beginning of the war we had enjoyed three or four years of comparative boom in the aviation business which had resulted in the city of Tulsa having about 100 private airplanes of all categories. Some other cities that we know of had comparable numbers, some of which were used by businessmen in their businesses, but most of which were used by amateurs and students who were learning to fly. Most of the airplanes cost around $1,500.00 to $2,000.00 delivered, but were useless for any cross-country purposes. They were not equipped with radio or instruments and they had limited gasoline capacities. There was no indication of a boom in higher-priced category. One of the largest and oldest private airplane companies had not built a total of 500 airplanes, and nobody except Piper had built over 1,000 airplanes. Different figures have been booted about, but after twenty-eight years of comparatively strong and lusty developments, we have about 30,000 private airplanes in the whole country.

We do expect a considerable increase in air transport of a commercial nature after the war. We think that a great many new prospective customers have been developed and that there is considerable sentiment for the transportation of all first-class mail by air. This will require probably immediately 400 to 600 transport aircraft for our domestic business. If there is a large increase in foreign trade, which is entirely problematical, and if the United States gets its share of it, then there may be another 100 to 200 commercial aircraft for that purpose. If the wide establishment of short-haul, feeder lines, etc., is permitted and fomented, then we could require countless aircraft for that purpose. If air freight gets a lusty start, it may of itself require several hundred or several thousand aircraft. However, it has not yet been demonstrated by any pictures we have seen that air freight will compare favorably with ground freight as far as cost and/or even time is concerned except for very large distances and comparatively small packages. One must not overlook the fact that truck-line transportation was reaching a very high degree of perfection immediately prior to the war. Trucks pick up items at your door, whether they be manufactured products, Grade-A raw milk, or your household furnishings that you are moving to some other point. They will deliver those same items to the door at their destination with a minimum of fuss and furor. They certainly do it with the greatest possible economy.

Americans have become more or less accustomed to neglecting economical principles during the last decade. But the fiddler will have to be paid one of these days, and we foresee and forecast a definite return to living under economical and economic principles.

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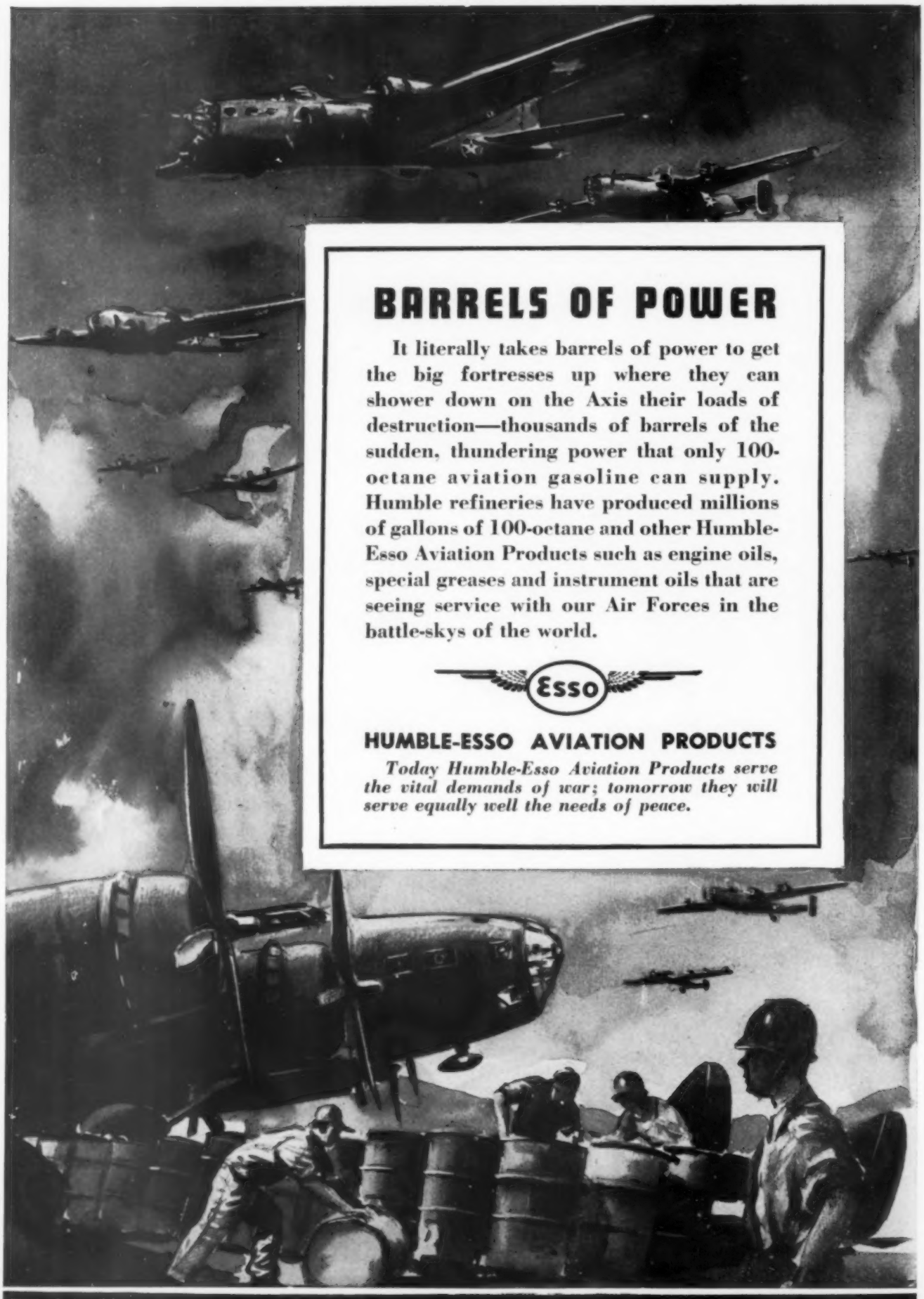

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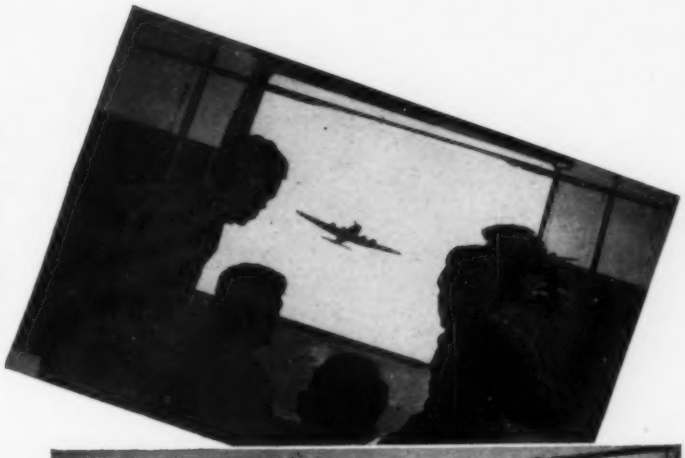
The job of the civilian flight contractor is to teach fledgling Army pilots to fly. Aerodynamics, meteorology, engines, navigation, aircraft identification and other related subjects are taught to Army Air Forces Cadets in addition to the fundamental mechanics which every soundly trained pilot must learn.



Photographs made at Georgia Air Service, Inc. schools; approved for publication by Bureau of Public Relations, War Department, Washington.

Adequately equipped academic buildings, shops and hangars are maintained at the Primary Training schools of Georgia Air Service, Inc. Every fundamental in flying is imparted to the Aviation Cadet. Our flight instructors, ground school instructors, technicians and aircraft maintenance specialists are men who are seasoned in experience and competent to give the training which makes U. S. Army flyers the best in the world!

Through this long war even our veteran technicians—both instructors and mechanics—have acquired valuable new experience. This will greatly benefit our services to commercial and private flyers after the war.

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Eaker Summarizes

1943 AIR CAMPAIGN

The Eighth Air Force in 1943 carried out 64,000 offensive sorties over Europe, dropped 55,000 tons of bombs, destroyed 4,100 Nazi fighters, and cut German fighter plane production almost 40 per cent with an over-all loss in heavy bombers of less than 4 per cent, Lieut. Gen. Ira C. Eaker, commander of the Eighth U. S. Army Air Force, reported at the time he relinquished his post in this theatre to command Allied air forces in the Mediterranean area. Lieut. Gen. Carl A. Spaatz, who replaces Gen. Eaker, arrived in London recently. General Eaker stated in his report that "On each of the last two days of the old year approximately 1,500 American planes attacked the continent from England, more than half of them four-engine bombers. This massive assault contrasts with the first American raid on Germany last January 27, when we managed to put fifty-three Flying Fortresses over Wilhelmshaven."

Bombers of the Eighth Air Force have penetrated as far as 800 miles into Germany and fighters have destroyed the best of the Luftwaffe in a ratio of three to one, Gen. Eaker added.

During December, the Eighth Air Force broke all records for weight of its offensive against Germany, the official report said. Ten major operations were carried out, seven on targets in the Reich and three in occupied France, with Flying Fortresses and Liberators dropping more than 12,000 tons of high explosives and incendiaries, twice the weight for November, and nearly 30 per cent more than the total for the first six months of 1943.

STRATEGIC BOMBING

(Continued from page 25)

ceived numerous direct hits. It was obvious that for a very long time many a German war device would stand useless without ball bearings. The only other great German-controlled production center for ball bearings, the one at Paris, had been previously smashed. The minor plants are still in operation.

Thus, when Schweinfurt was a mighty mess of smoking debris, it was handed back to Hitler. What the meaning of it all was in relation to the course of the war was told by General Arnold:

"We cut down his tools of war before they could ever be forged. We cut down his motor lorries before they could be assembled. We spiked scores of his anti-aircraft guns before they could even be mounted. And we blasted from the skies a vast armada of his fighter planes which is rendered even larger because at the same time we were blocking his ability to replace them."

Indeed!

As for the cost of the raid in American planes and crews, the Commanding General of the Army Air Forces explained:

"Let me tell you something about bringing these airplanes home. When we lose airplanes it doesn't mean we are going to lose the crews. We don't always lose the crews. Crews go into the English Channel. On one raid we rescued twelve crews out of the English Channel. So just because somebody says we lost sixty airplanes, it doesn't mean we lost sixty crews by any means. We may lose the airplane but save the crews."

It is believed that at least half of the lost 593 airmen from the sixty Fortresses are alive as prisoners of war. It has also been pointed out that a series of smaller air raids result in a higher overall percentage of losses and do less damage to the enemy. Hence, sweeps by great aerial fleets are considered by our high command more economical as well as more productive.

How Targets Are Selected

It seems that our streamlined Air Forces organization has infused a new meaning into the old military maxim, Economy of Effort. How much more would it cost us in lives and equipment if we were to try to deal on the field of battle with all the tanks, guns, planes, submarines whose utility we vitiate long before they reach their battle stations, thanks to the strategic aerial bombardment of industrial targets! It all is a matter of depositing the bombs precisely where they will do the most damage of long-range significance.

To attain the remarkable results registered by the Eighth Air Force in Germany, some of military history's most painstaking planning was required. It involved a complete analysis of Axis industries to determine the comparative value of each type to the German war effort. Then the relative vulnerability of each industrial unit in question had to be evaluated. Cities as such were not considered but units of industry in a given city were singled out for destruction through precision bombing.

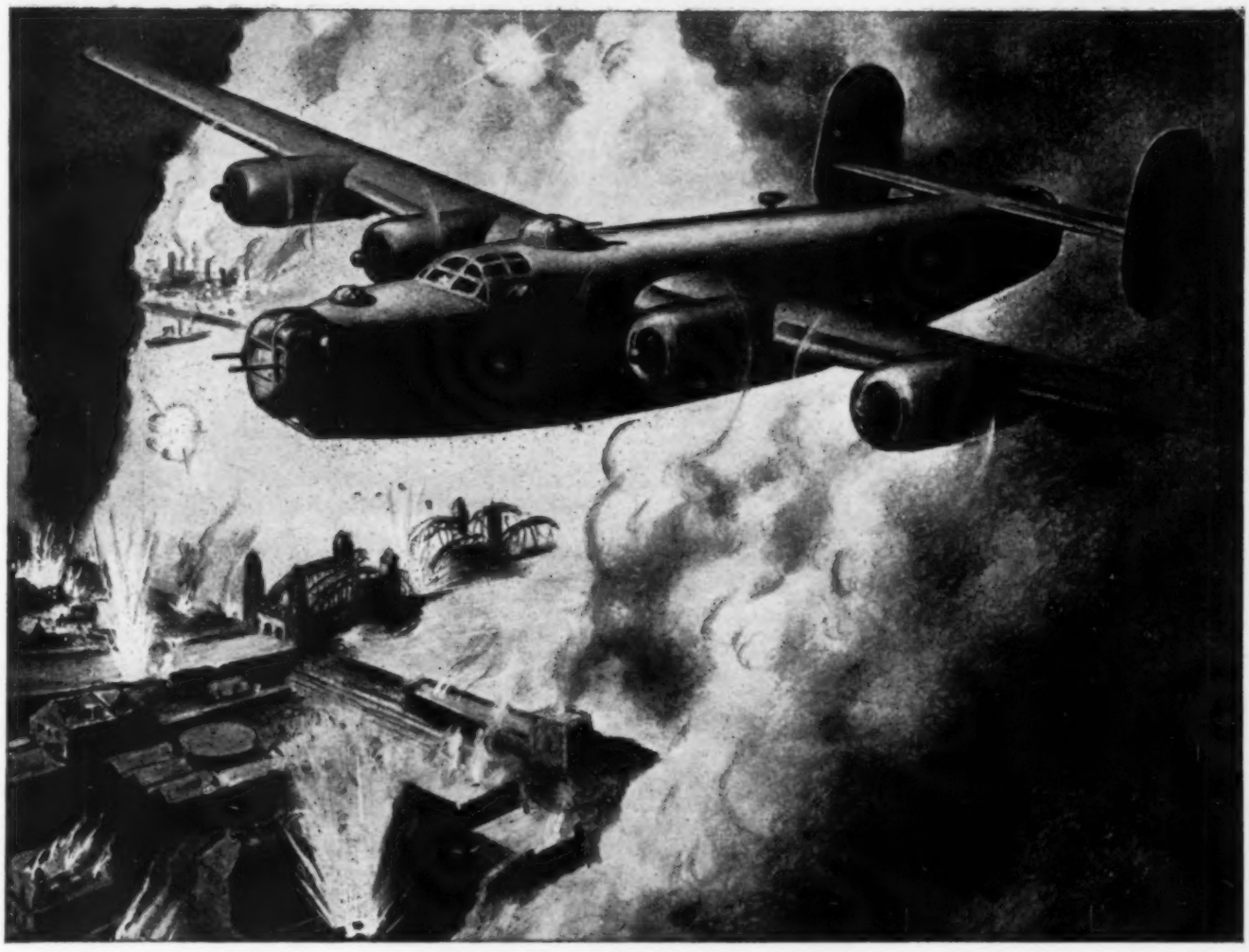
In the Army Air Forces there is a group of the nation's foremost economists and industrialists who are constantly engaged in mapping out the vital industrial targets. Working in their civilian garb, they are making a great military contribution.

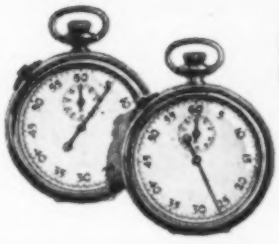
Including financial and technical advisers, this group has files which incorporate full details of most of Germany's industrial bases. These economic warriors include construction engineers who are able to tell the military in what nook of what building lies the heart of each industrial target.

The ultimate choice of the targets depends on many complex considerations, prominent among which are the capacity of the Air Forces and the time element. Often our press tells of effective attacks upon such objectives as the submarine bases at St. Nazaire, Lorient or Brest, which are not in the strategic plan at all. Those raids are motivated by immediate tactical requirements.

As for the strategic economic analysis, this has established that a comparatively low percentage of the hundreds of industrial units must be destroyed in order to ruin the Axis opportunitiies for waging war. Just the same, we cannot be reckless in our bombing methods, for we know our own limitations in production and ability to replace equipment and manpower. For this reason, precision bombing of Festung Europa has become the American plan. Artillery and infantry operating on the ground have always placed a premium on accurate aiming of their fire. The American Air Forces long ago established this principle for air bombardment. What the precision bombardier is after has been succinctly told by

(Continued on page 46)





For the next 20 seconds, the pilot's name is Elmer!

APPROXIMATELY 20 nervous seconds elapse between the time a bomber goes into its final run and the time it pulls out and heads for home.

During these vital 20 seconds, which determine whether the mission succeeds or fails, the pilot of this bomber is a machine—the Sperry Gyropilot.* He's "Elmer" to the U. S. bomber crews —"George" to the fliers of the R.A.F.

Why is the plane turned over to Elmer? Because Elmer provides the precision control necessary to maneuver the airplane correctly during the bombing run.

Elmer holds the ship steadier—truer —than any man can do. His errorless control is one of the big reasons for the accuracy of American precision bombing.

Elmer not only does this but, going to and from the target, he can hold the big ships in level flight and on their course with no hand on the controls.

Naturally, a device like this is not created overnight. Sperry developed the first automatic pilot before the last war. It was designed to increase safety in flight. Pioneering and development work continued. In 1933, Wiley Post flew around the world alone with the aid of a Sperry Gyropilot.

Post's epochal flight furnished spectacular proof that Elmer was practical. Sperry Gyropilots were soon standard equipment on transport planes the world over. When World War II came, still further improvements had been made to give Elmer the precision needed for bombing missions.

Improvements are still being made. When the war is over, Elmer, along with many other Sperry devices developed for peace and adapted to war, will return to the work for which he was originally designed.

With more than 30 years of development behind him, Elmer, the Sperry Gyropilot, will be well-equipped to serve tomorrow's world-wide airlines.

American bombers are now being equipped with the new Sperry* Gyrotronic* *Pilot, a precision, electronic version of the Gyropilot.*

*Trademarks Registered

SPERRY

GYROSCOPE COMPANY, INC.

Brooklyn, New York

Division of the Sperry Corporation

STRATEGIC BOMBING

(Continued from page 44)

Brigadier General Edgar P. Sorensen, Assistant Chief of Air Staff for Intelligence:

"The enemy war machine—and it *is* a machine—is analogous to an automobile which we want to prevent from running. It is parked at the curb and entirely within our reach. Would we take an axe and start chopping and pounding until we beat it to a pulp? Or would we merely take out and hide the rotating contact in the ignition distributor?

"Another analogy is in the old story that 'for want of a nail, the battle was lost.' We take away the nail.

"More specifically, we might point out that, though we can stop a tank by killing its occupants, suffering casualties on our side while doing this, would it not be more economical to destroy the potential tank by taking away the lathe used in its construction? Strategic bombing has that for its initial objective."

Terror Not Our Goal

The concept of the daylight, high-altitude attack on vital pinpoints on the industrial map of Europe calls for thousands of sorties, has its well-worked-out sequence of phases, and holds that it can account for staggering industrial decay in the enemy camp, a decline in life-and-death production, which cannot help having fateful consequences to the enemy strength on land and sea, and in the air.

Such a concept eschews the notion that air sweeps designed for terror-spreading alone can bring such a cave-in of morale as to compel a great modern nation to sue for peace. Attempts at mere terrorization have not worked in England, Germany, or Russia.

Only the veriest amateurs at strategy can insist with a straight face that the world's industrial plant can turn out enough planes and bombs to blanket all of even so tight little island as England with fire and explosive, thereby making sure of demolishing the industrial vitals.

Our realistic air strategists, looking at Britain, decided that even there industry was not so concentrated as to justify the German attempt at solid coverage by comparatively unaimed bombs. That is why the British industry came back fighting mad after Hitler's scatter-bombing blitz. The American Air Staff decided that it was easier to perfect a method for levelling, say, a machine shop, than the far greater expanse of the residential areas occupied by the workers required to keep this shop running. The effect on the German war effort is obviously at least as telling.

The best testimonial to the efficiency of the American plan is, of course, the seriousness with which the Nazis try to stop our heavy four-engined bombers from making their deep penetration. Hundreds upon hundreds of Luftwaffe fighters have been stationed in conquered Western European countries which lie between Germany and England. In General Arnold's words:

"They've got all the long-haired scientists they can thinking up new means of stopping us . . . rockets, glider bombs, small incendiary discs, bombing from overhead, long-range cannon, new techniques, new tactics. And one of the most important things of all is the message that Goering got out—that daylight bombers must be attacked at all costs, regardless of loss."

Foundation for Peace

The uniqueness of the American plan extends to its postwar implications. Precision bombardment of industrial-military objectives rather than indiscriminate saturation bombing is undoubtedly contributing to lessening of international hatreds after the war. At its best, aerial bombing results in some mild extraneous destruction, making the war an acute nightmare to victim populations. Rankling memories after the war are apt to prove stumbling blocks to genuine peace. Specialization in precise aerial aiming is certain to hasten the advent of postwar amity and understanding. The Rumanians, for example, may not prove unmindful of the fact that when the Americans determined on their strategic assault on the Ploesti oil centers, they picked Sunday as the day in the hope that the workers in the refineries would be away from the targets of the B-24 bombardiers.

Another tieup with the postwar situation may be seen in the daylight precision operations. In war and peace the world is henceforth a closely knit economic unit. Advances in modern communications, including air transport, have made sure of that. International economic interdependence means that the standards of living in various lands are affecting one another. To avoid a distressing lowering of our own welfare, we will have to assist allies and former enemies in their postwar reconstruction. Hence, our highly selective (though none the less effective for that) bombing not only speeds the day of victory but also makes for a less painful rebuilding period.

Summing up, strategic American bombing of Europe, in conjunction with the British area bombing and with the frustrations administered to the bulk of the German war machine on the Soviet fronts, is causing the Germans costlier damage than they can afford. Our missions are carefully mapped out with a view to demolishing the sinews of enemy war-making on the ground. Our losses are anticipated and are being replaced. The hard blows to the Germans are in the main irreparable, as clearly evinced in the progressive deterioration of Goering's air weapon.

As neither the human factor nor the element of chance can be eliminated from warfare, the doctrine discussed in the foregoing pages will never be translated into reality in its pure or ideal form. Its already demonstrated efficiency and savings in blood and treasure mark a milestone in military philosophy and strategy, while its continued perfection is apt to drive home to mankind the lesson that future warfare is certain to be an even vaster insanity and misery than the present one.

On Defeating Japan

By COL. ROBERT L. SCOTT, JR.

Fourteenth Army Air Force bases in China flank every Jap task force and convoy that goes to the Southwest Pacific and to Singapore. Put enough fighter planes, fighter-bombers, and bombers to work from those fields . . . put enough heavy air transports into Eastern Assam to bring the fuel and war supplies from India to China—do this and these Jap lines of supply can be broken or driven so far out into the Pacific that our Navy can render them extinct.

That is OUR WAR which we will win from Chinese bases that General Chennault had scraped from the Good Earth of China with the very fingernails of coolies. Victory is there at the end of the longest supply line in the world. That's the shortest way home.

These few poignant lines are from an article which will appear in SOUTHERN FLIGHT *for February, 1944—an exclusive feature written for us by Col. Robert L. Scott, Jr., veteran fighter commander of the 14th AAF and author of the best-selling book, "God Is My Co-Pilot".*

Don't miss Bob Scott's inspiring article in next month's Southern Flight.

Cessna Test Pilot, who has flown a MILLION MILES

RIDES WITH *Romec!*

"I have flown a distance equal to 40 times around the world As a CESSNA Test Pilot I can say that the positive displacement, non-pulsating ROMEC fuel pumps, and the ROMEC vacuum instrument pumps are darned good pumps. In fact, they improve the dependability of the CESSNA—the finest trainer made"

Carl D. Winstead.

BUY WAR BONDS

ROMEC salutes Carl Winstead for his million mile record and the CESSNA AIRCRAFT COMPANY which has made a splendid record in building fine trainers which have helped to make the American Air Forces the finest on the fighting fronts.

ROMEC PUMP COMPANY · ELYRIA, OHIO, U. S. A.

Manufacturers of Aircraft Pumps and Accessories

AVIATION'S TOMORROW

(Continued from page 35)

want. "The Lord has fortunately given us ample skyroom for both airlines and private flyers," he added.

Roscoe Turner brought cheers from the group when he stated: "There's something cooking now that will destroy our steak before you get to it, if you don't get in motion. How many of you have taken the trouble to read the bills pending before Congress that will affect your business? Now what are we going to be — men or mice? Are we going to make the people in government 'servants of the people' or are we going to be lulled to sleep and become slaves of bureaucracies?"

Extension of WTS

It was natural for the convention to go on record for extension of present War Training Service when the present Civil Pilot Training Act expires June 30, 1944. Unless the Army and Navy request the extension, the program that has done so much for the rapid expansion of our military air arms will, of course, come to an end.

A highly intelligent and factual accounting of WTS was presented by R. McLean Stewart, executive director of training, CAA.

He reported the following interesting figures:

1. More than 300 centers being used in the program.

2. In the week ended November 11, 1943, a total of 27,691 men were assigned to flight training in the programs for Army and Navy. In the period from January 1, 1943, up to the middle of November no less than 175,917 individuals received pilot training in the several programs supervised by the CAA-WTS.

3. Flight and ground school contractors were giving employment to 9,876 persons, including:

5,002 flight instructors
1,209 ground school instructors
3,613 mechanics and helpers.

4. 7,355 airplanes were being used by flight contractors in the training program.

5. Since July 1, 1939, an aggregate of $227,697,689 has been appropriated by the Congress for pilot training through civilian agencies, including $89,020,239 for the current fiscal year.

As for the future, Stewart had this to say:

1. That the Navy will have less need for the assistance of civilian training centers and that it may well be that after next June, they will not find it necessary to make further use of these facilities.

2. The program which is being conducted at fifty-six centers where former members of the Air Corps Enlisted Reserve are being trained as flight instructors for the Air Forces, is a closed program.

3. There is no indication today that either the Army or the Navy will have any need for the services of these centers for any new training activity. The leveling-off point may already have been reached.

4. The flight indoctrination course (Air Forces College Program) is apparently serving an important and useful purpose. All information indicates this course has a definite place and will continue to be required.

Stewart gave the operators one ray of postwar hope when he strongly maintained that "we must make sure that a large number of young people shall be taught to fly each year. It would be reasonable to provide facilities and aid to enable, say, 100,000 young men to learn to fly each year. Preferably this group would consist of youngsters up to age twenty. We need such an influx of young pilots if we are to retain command of the air. We need them for civil aviation. We need them as a reserve to which we can turn if we are called on again to exert our armed strength in the air. Nor can we leave aviation training to the unaided resources of private individuals. It seems to me that to some extent at least the Government must help in the development of postwar civilian pilot training.

"When the pattern of federally assisted postwar flight training is finally set, we may find that a larger proportion of it will be conducted in high schools than is now the case. The colleges should remain the backbone of the system. Many of them may be able to carry on their own programs without federal assistance. I believe very strongly that it would be desirable in the general public interest to establish an elementary pilot training program in conjunction with the high schools so that it will reach a large cross-section of the population and form the basis for other developments which will keep us unbeatably strong in the air."

"Tich" Proposes Air Cabinet Post

Frank A. Tichenor, publisher of *Aero Digest* and chairman of the Aeronautical Advisory Committee to the Department of Commerce, added more good fuel to the flame that burns in many airmen's hearts for the creation of a separate department of air—a cabinet position whose title might well be "Secretary of Air Commerce." The post would be filled, in Tichenor's own words, by "a forceful man who can develop an organization and get things done." In his opinion we must establish a clearly defined statutory code to replace bureaucratic discretion. He urged that more attention and time be given to research and less to politics, else we shall be destroyed. He also touched on postwar aviation planning, advising that air reciprocity with other nations be the basis for dealing in the building of global air services.

Another interesting address was made by the national commander of the American Legion, Warren Atherton of California. It was his considered opinion that air transportation in the future would tend to contribute more traffic to the railroads and steamship lines rather than take business away from them. He believes that the great developments of the future will come in cargo comprised of high per-unit value and in the transport of perishables.

New Roster of Officers

Here is the list of officers who will steer NATA through 1944:

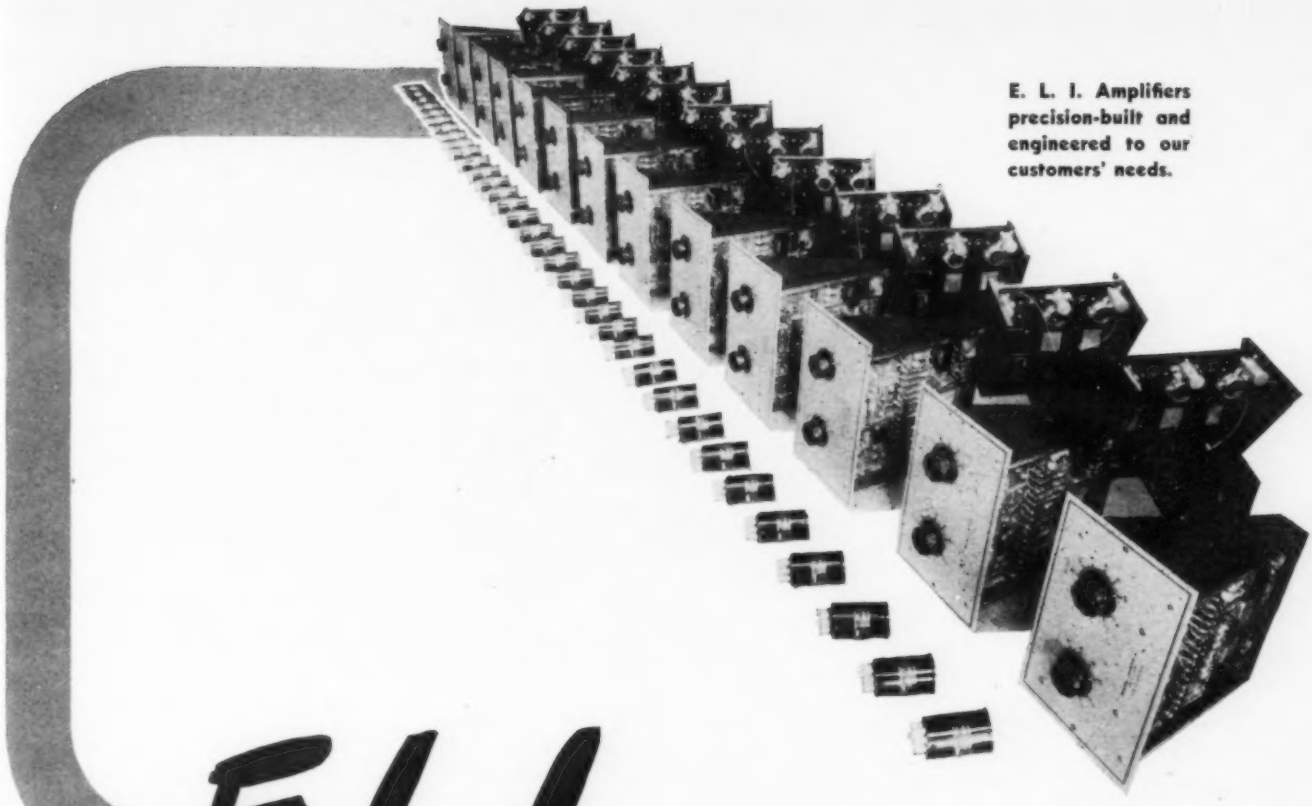
Roscoe Turner, Indianapolis, Ind., president; Les Marsden, Buffalo, first vice president; Henry von Berg, Carson City, Nev., second vice president; Les Bowman, Fort Worth, retiring president, chairman of the board. Members of the Board include Wm. C. Breedlove, Lubbock, Texas; W. F. Underwood, Atlanta, Ga.; Arthur Curry, Galesburg, Ill.; Ray Hylen, Rochester, N. Y.; F. C. Anderson, Des Moines, Iowa; Gwin Hicks, Coeur d'Alene, Idaho, and Henry von Berg, Carson City.

The executive committee appointed by Turner consists of Bowman, Marsden, von Berg, Bill Ong, Kansas City; Wiley Post, Allentown, Pa.; H. B. Harms, Los Angeles; Howard Barlow, College Station, Texas, and Ray Snyder, Chicago, who was re-elected president of the Aviation Distributors and Manufacturers Association.

Annual dues of WTS NATA members will remain at the previous figure of $100, while non-WTS operators' dues will be only $50. All operators wishing to join NATA or desire information about the organization need only to write Central Headquarters located at 214 E. Armour Blvd., Kansas City, Missouri.

Ceiling Price on Used Airplanes

The War Production Board has announced a ceiling price will be placed on all used civilian type aircraft of 500 horsepower or under. The order came after an appeal by the Civil Aeronautics Administration. The CAA maintains the ceiling will encourage more private flying activity.



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is busy today contributing our share to the winning of Victory, building vital military equipment, ranging from landing gear shock strut assemblies to pressure reducer valves for automatic pilots and electrical detecting and measuring instruments. At Engineering Laboratories, Inc., the manufacture of equipment to exacting precision standards on a production basis, is an interesting story of over twelve years' experience in the development of many instruments and services that are in World-Wide use by the Petroleum Industry.

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EQUIPMENT IN WORLD-WIDE USE

(Continued from page 29)

over-extended operations. To illustrate my point, may I suggest that no sane banker operating on a capital of $10,000 would take on $10,000,000 of loans and deposits. But if he had a capital of $1,000,000, he would be perfectly safe. Just as an increased volume of loans means increased risks to the banker, so increased volume of sales means increased risks for the aircraft companies.

The demand for planes has forced the aircraft companies to expand their volume way beyond what sound business management would have dictated. The only protection which they can have against these forced risks is sufficient profit or reserve which can be set aside to provide for these contingencies when they arise. The figures show that the tax structure and renegotiation have not made a sufficient allowance for this purpose.

I should like to demonstrate that the wartime earnings allowed the aircraft industry are far less than those allowed better established, less expanded enterprises. The Harvard study shows that, after taxes and renegotiation, the aircraft industry was allowed profits of only 2.7 per cent on sales in 1942. This may be compared to 8.3 per cent for General Motors, 13.8 per cent for duPont, 7.5 per cent for Sangamo Electric, 10.6 per cent for Deere & Co., 10.5 per cent for Eastman Kodak, and 7.4 per cent for Johns-Manville. In 1939, the aircraft industry earned 10.4 per cent.

I should also like to point out, as shown by Chart 7, that the aircraft industry has followed a very conservative policy with respect to the earnings which it has received. Chart 7 shows that only 23 per cent of profits received by the aircraft industry in 1942 were paid out as dividends to stockholders, as compared to 64 per cent distributed by average industrial companies. The aircraft industry, obviously, has acted upon the fears which I have described by retaining in the business most of its profits allowed after renegotiation and taxation, to prepare for the difficult postwar period. We are fearful, however, that the amounts which we are thus permitted to retain will be far from adequate.

Industry Needs Funds After the War

I have endeavored to show the weak financial position of the aircraft industry. You may wonder what we anticipate to be the probable drains upon our financial resources during

WHERE THE "PROFITS" GO

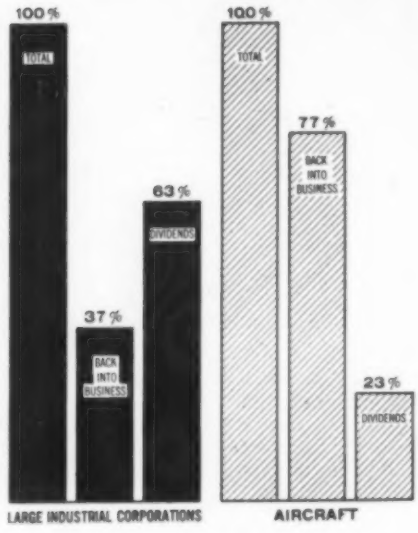


CHART 7

the postwar reconversion period. You undoubtedly realize that in view of all the uncertainty as to aviation developments, demand for aviation equipment, size of military establishment, and other factors, it is impossible for us to make precise estimates as to our postwar requirements. I can point out to you, however, some of the factors which lead us to believe that we must have substantial financial resources at the end of the war if we are to survive.

First, we cannot escape the conclusion that we will suffer losses upon the termination of our contracts. In view of the enormous expansion which I have described and the constantly changing conditions under which we have been operating, it seems inevitable that we will not be able fully to support all of the expenditures and costs which we have actually incurred. We are doing our best to maintain adequate accounting systems, but it seems probable that unavoidable wartime human error will cost us substantial sums on contract termination settlements. In addition, we will have substantial expenses for rearrangement of our plants and facilities to be ready to carry on peacetime production.

We do not believe that the American people wish our industry to be supported solely at Government expense by maintaining our industry entirely upon postwar production for the Army and Navy. We foresee a great future for postwar commercial and private aviation. To be ready to meet this future, however, we have a great deal of work to do in product engineering which we are of course not able to do during the war. However, the development of models for postwar aviation will be extremely costly. Great efficiency in airplane equipment is being achieved but the models are very complicated. It will undoubtedly require three or four million dollars for engineering work alone to develop a design for an advanced, large-size commercial transport after the war. Furthermore, the engineering work must be followed by a costly period of tooling up, so that it is very likely that fifteen million dollars or more will be expended by a single company on a single model before the first unit is completed and ready for delivery so that income from it starts to flow in.

When we turn our thoughts to development of private planes we face a similar prospect. Private planes will take their place in American life only when we achieve mass production of them. The engineering work and tooling required to accomplish this will again be very costly and run into many millions of dollars.

What Conversion Means

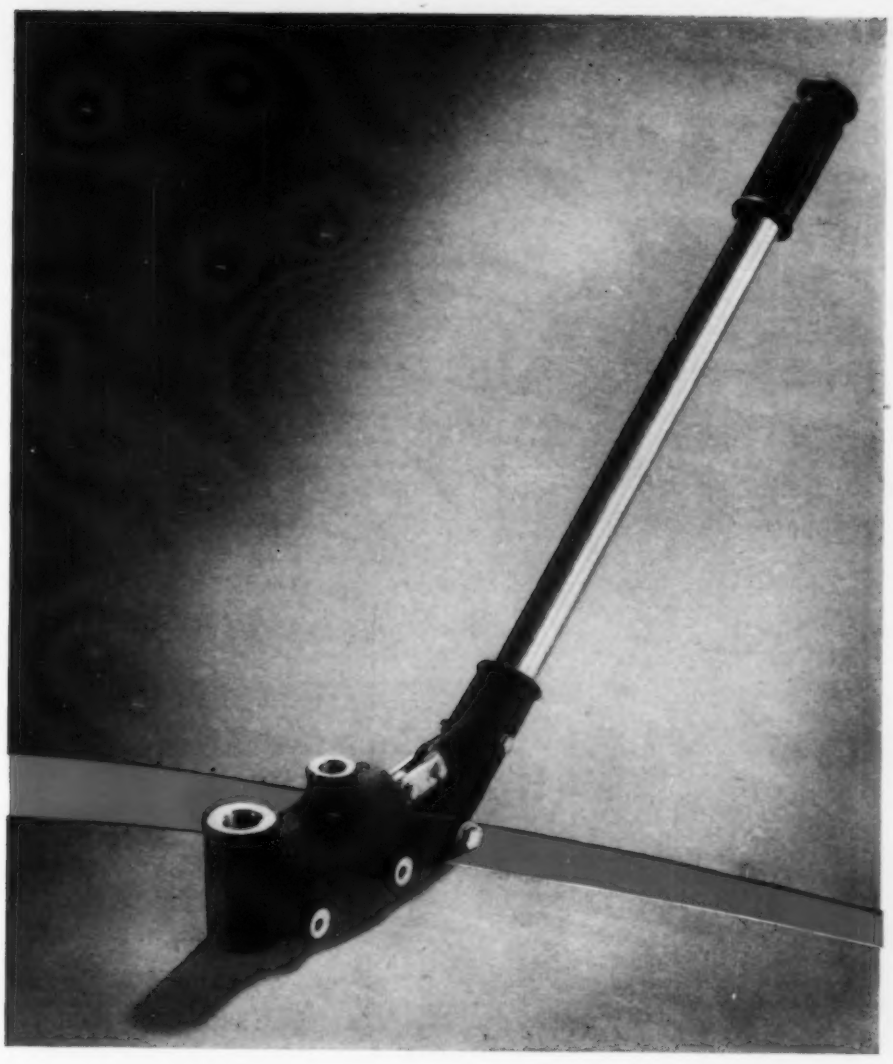
We cannot escape the conclusion that there will be a period of months, and perhaps of more than a year, during which the inflow of funds will be virtually stopped while we do our product engineering and prepare for peacetime work. During this period we must maintain our engineering staffs and keep at least a nucleus of our organizations. We will of course make every effort to find ways of keeping busy as much of our working force as possible. We will have the continuing burden of property and other taxes, depreciation charges and other expenses. These costs will run into large sums each month and we are fearful that our financial resources will not hold out until our peacetime sales commence and we can achieve a normal peacetime operating status.

I should like to summarize the drains upon our financial resources which we foresee in the conversion period:

1. Contract termination — 11.6 per cent inventory decline wipes out working capital.
2. Cost of rearrangement of plant.
3. Designing new transport planes — expenditure before first delivery, $15,000,000?
4. Mass production of private planes — X million dollars for production line tooling.
5. Maintaining organization until postwar sales provide sufficient funds.

We believe that the events of this war have amply demonstrated that America must have for all time in the future a strong aircraft industry. This can only be possible if the industry

(Continued on page 52)



A NEW HYDRAULIC EMERGENCY HAND PUMP

This new hydraulic hand pump AN6201-1, designed and manufactured to meet Army-Navy Specification AN-P-14, is now ready for production. Simplified construction eliminates all threads except at inlet and outlet ports . . . weighs only 2.5 pounds without handle . . . capacity 1.5 cubic inches per stroke cycle at 1500 p.s.i. Can be furnished with collapsible or non-collapsible handle, or without handle. *Other models of emergency hand pumps now in production are available for quick delivery* . . . Hand pumps are but one item in the wide variety of dependable products Air Associates engineers and manufactures . . . or supplies to the aircraft industry.

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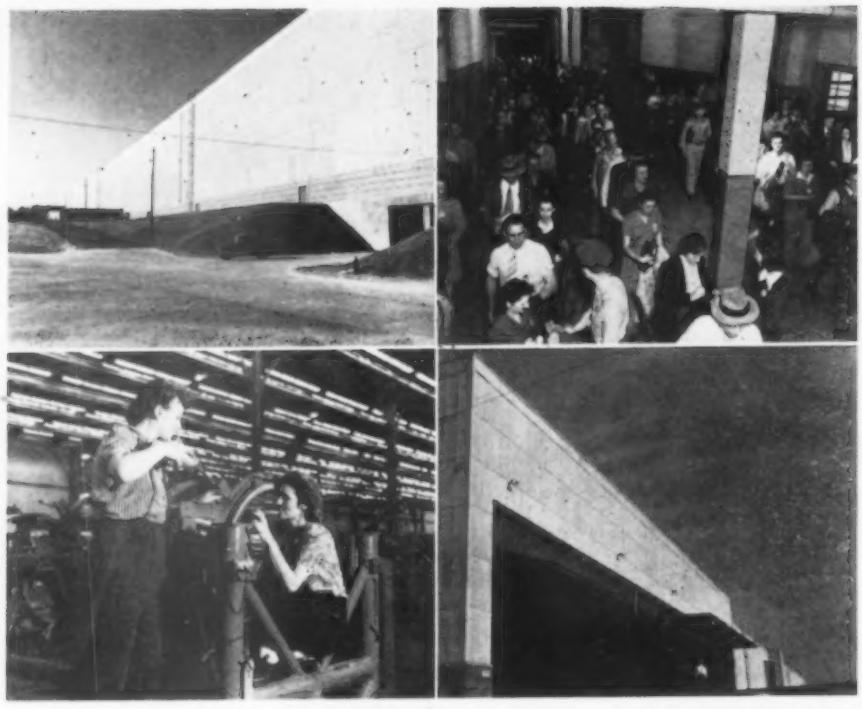


—(Bell Aircraft Photos.)

SUPER BOMBERS SOON WILL FLY from the huge Bell Aircraft Corporation factory at Marietta, Georgia. These latest photos of the new operation show progress. Top left shows the south side, with a truck emerging from a basement tunnel. Other tunnels are for employes and vehicles entering or leaving through headhouses near the north side. Top right shows workers being checked through turnstiles at one of five headhouse entries. Bottom left shows two of Marietta's thousands of women workers, busy in the fuselage assembly department. Note size of jig for the parts they're handling. At bottom right is a "mechanical marvel" door opening from final assembly bay onto the flight ramp. A curtain of warm air is fanned down from roof when door opens in winter, preventing inrush of cold air.

AVIATION BANKRUPTCY

(Continued from page 50)

has sufficient finances to do its job and do it well. The position of leadership in aircraft engineering and production techniques which we now have can only be maintained if the aircraft industry has the resources to maintain itself. This can be insured, however, only if the Government now recognizes the gravity of the problems with which our industry will be faced at the end of the war.

Adequate Reserves Needed

The Senate Finance Committee has before it a revenue bill in connection with which will doubtless be considered several matters which are of vital importance to the aircraft industry. I should like to discuss these matters and make some recommendations for action. These matters may be listed as follows:

1. Adequate postwar reserves,
2. Renegotiation of war contracts,
3. Improvement of the carry-back provisions in the tax law,
4. Improvement of the exisiting postwar reserve provision,
5. Practical amortization of plant facilities.

1. Adequate Postwar Reserves:

The Senate Finance Committee very properly caused the enactment in the Revenue Act of 1942 of a provision for a postwar reserve which had the salutary effect of lessening somewhat the impact of a 90 per cent excess profits tax rate. While there are many concerns for whom the existing reserve is adequate, we believe that there are many others as to which it is not. Although the Treasury has pointed out that corporations have accumulated since 1939, after dividends and taxes, around twelve billion dollars, we think it is apparent that this accumulated reserve is not evenly distributed among all classes of taxpayers. The aircraft industry is probably the outstanding example of an industry which has not been able to accumulate adequate reserves for the postwar problems it faces.

It appears, therefore, that a further reserve is very much needed in some cases and should be given serious consideration by the Senate Finance Committee. It is apparent, however, that such a reserve must be selective in its operation so that it will provide the greatest benefit to those who need it most and a lesser benefit to those whose need is less.

There seems to be a simple method whereby this can be accomplished. The chairman of the Senate Finance Committee has advocated such a method for a long time and it has been discussed by others in Congress. This method would permit a present deduction for a postwar reserve in arriving at net income. We believe that the deduction should be 20 per cent of net income. The amount represented by the deduction would, however, be paid into the Treasury along with the tax. For the amount of the reserve the taxpayer would be issued a special issue of Government bonds. The proceeds of these bonds should be taxable to the taxpayer when received.

This relatively simple provision seems to do the job well. Those who suffer losses after the war, when they would collect the proceeds of the bonds, would not pay a tax because of these losses and they should not, since they, by their losses, have shown their need for the reserve. Those who suffer no losses would be taxed upon the proceeds and would thus receive less benefit from the provision and they should, since, by earning income in the conversion period, they have shown that they needed the reserve less.

In considering this proposal the committee will be faced with a decision as to the rate of tax which should be imposed upon the proceeds of the bonds when collected by the taxpayer. Various proposals have included taxation at capital gains rates, taxation at normal tax rates, taxation at full tax rates in effect in the year of receipt, and taxation at war rates which were in effect when the original deduction was taken. Our industry would be wholly satisfied with any of these proposals. If we are so fortunate as to have income in the postwar year in which we collect the proceeds of the bonds, we will be delighted to pay any reasonable tax burden thereon, and we believe other taxpayers should feel the same way.

If such a reserve is adopted, we hope it will not be found necessary to tie up the bonds received so that they cannot be used when the need arises. The events of the war have fully demonstrated that the postwar reconversion problem of different war contractors will be strung out over a long period of time, as the demands for war equipment change and become less. It will not, therefore, be possible for you to select a single date after which the proceeds of postwar bonds can be collected, without destroying the utility of the provision to many taxpayers whose need arises before that time. It should be possible to permit realization of the proceeds at any time if such proceeds are to be fully taxable, because no taxpayer would collect the proceeds now and pay taxes at high wartime rates if he might obtain the proceeds later when his need arises and he might have losses and pay no tax.

We strongly recommend that the Senate Finance Committee adopt a provision for this type of reserve in the current revenue bill. It will go a long way towards solving the serious financial problem of the aircraft industry. If its adoption is deferred any longer, it may come too late to be of any substantial assistance to us.

2. Renegotiation of War Contracts:

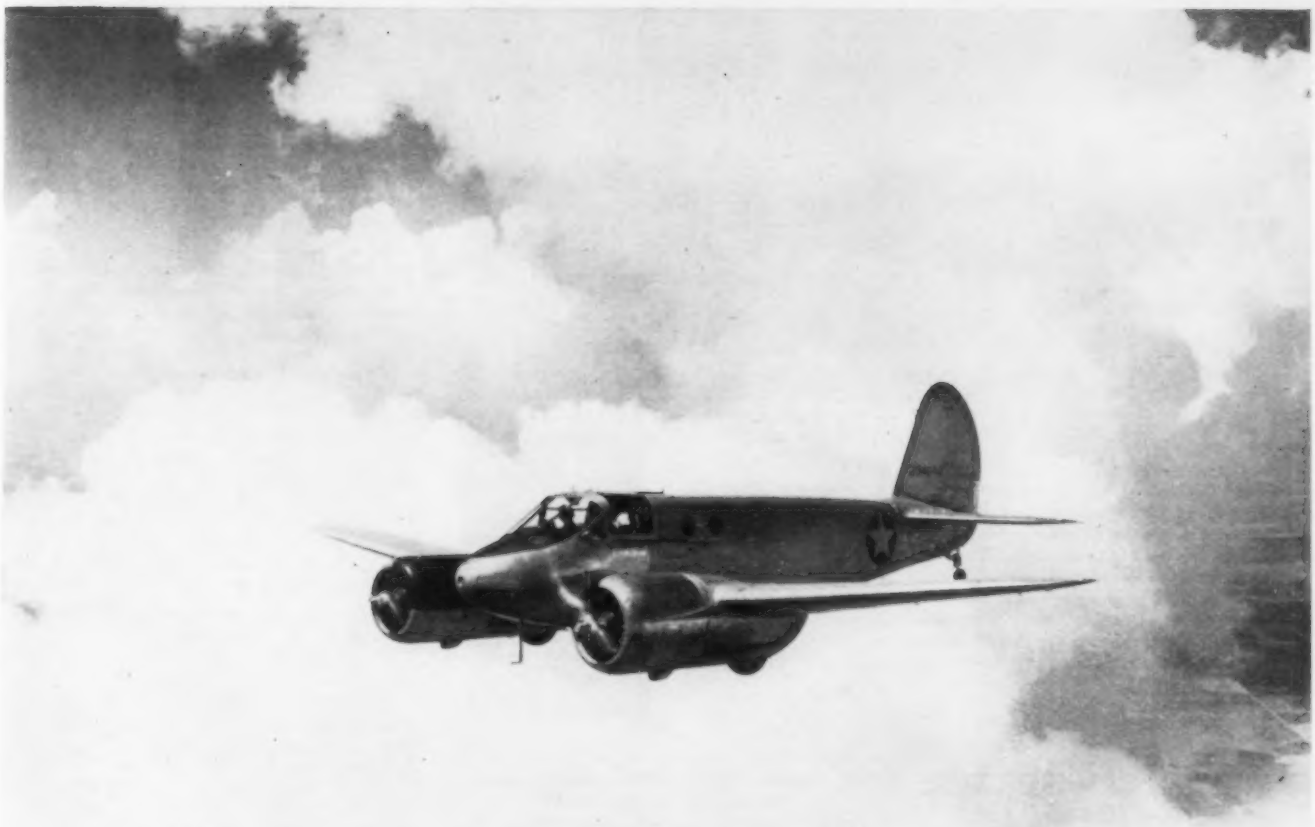
Our industry certainly subscribes to the general view that no excessive profits should be derived from this war. We recognize that renegotiation of war contracts was a device created to prevent excessive profits. The present weak financial condition of the industry is due in part at least to renegotiation.

Unfairness in Renegotiation

We cannot understand the logic of a system which for example, allows the Boeing Aircraft Company, which has certainly made one of the outstanding contributions to the war, a profit after taxes and renegotiation of 2.1 per cent on sales and allows duPont 13.8 per cent, General Motors 8.3 per cent and other companies the amounts I previously described. Those companies are doubtless entitled to what they received, but we feel that some increased recognition should be given to the aircraft industry.

Furthermore, we believe it is clear that there is no theatre of the war effort in which there are enough airplanes. General MacArthur doesn't have enough; we do not have enough bombers in England to maintain thousand-plane raids every night, which would unquestionably shorten the war. The men who are responsible for producing the maximum possible number of airplanes are the executives of the various aircraft companies. Renegotiation of contracts has taken large amounts of time of these people and will doubtless continue to do so if it continue to be applicable

(Continued on page 54)



COMMENDED IN 1943 FOR—

Sustained Production

—AND READY TO REPEAT IN 1944!

GLOBE AIRCRAFT CORPORATION

FORT WORTH, TEXAS

Manufacturers of the AT-10 Advanced Trainer and the Swift GC-1

FLIGHT TESTING OF HIGGINS HELICOPTER, scheduled soon at the New Orleans shipbuilder's plant, has attracted attention for Enea Bossi (at right), Italian aviation pioneer. Details of the craft, depicted by the drawing above, have not been divulged. Bossi, at the age of twenty in Italy, built and flew a biplane with one motor driving two propellers. In 1913 he designed and built the first twin-engined Italian Navy flying boat. Drawings for the Higgins helicopter were started last March and construction began last August. He claims high speed and inherent stability allowing "hands off" flight for the craft.

AVIATION BANKRUPTCY

(Continued from page 52)

to their companies. We do not believe that this is in the interests of the war effort or of the American people.

We should like to make it clear that, as far as its effect upon our industry is concerned, we believe that renegotiation of contracts is an unsound process not in keeping with our principles of government. If renegotiation cannot be repealed, there are two proposals which we recommend:

(a) *Allow an option to elect an increased tax rate in lieu of renegotiation.* Due to the great demands which renegotiation makes upon the time of our executives, we would be willing to pay a reasonable amount of increased taxes in lieu of being renegotiated, despite our weak financial position. We recommend, therefore, that all contractors be allowed an option to be taxed at a 95 per cent excess profits tax rate and at an 85 per cent ceiling rate (rather than the present 80 per cent), instead of being renegotiated. This proposal would eliminate present vast uncertainties and would save enormous amounts of time of American business men which should be devoted to production efforts.

(b) *Provide a "floor" after taxes.* In the alternative, if the foregoing option cannot be adopted, we recommend a "floor" which will allow a contractor to retain after taxes, either (1) an amount equal to the excess profits credit, or (2) an amount equal to 3 per cent of sales. If this proposal is adopted, renegotiation should be done after taxes rather than before.

(c) *Eliminate retroactive renegotiation.* We believe that the recapture by renegotiation of profits earned before the renegotiation statute was passed on April 28, 1942, is thoroughly unsound. The Senate Finance Committee has generally been opposed to retroactivity and to discrimination. Both are involved in renegotiation with respect to profits earned before April 28, 1942. We recommend the elimination of this retroactivity and the refunding of retroactive amounts previously taken by renegotiation with respect to items delivered before April 28, 1942.

3. Improvement of the Carry-Back Provisions in Tax Law:

The Senate Finance Committee should be given much credit for adopting in 1942 the thoroughly sound provision for the carry-back of losses and unused excess profits tax credit. These provisions are correct and in theory are very beneficial to industries such as the aircraft industry, since they recognize that war profits may be artificial and should be averaged to reflect postwar losses.

Unfortunately, the carry-back provisions as now written are of no practical value to an industry such as ours which is faced at the end of the war with a shortage of liquid assets with which to meet the postwar reconversion problem. This is because the carry-backs result merely in a right to tax refunds. Under the orderly procedure generally in effect with respect to tax refund claims, it is a matter of years before they are processed in the Treasury Department and actual payments made. Refunds under the carry-back provisions will therefore be received long after our industry has faced its reconversion problem and either solved it or gone into bankruptcy. We seriously doubt our ability to solve our problem without immediate benefit of the carry-back provisions.

It is possible to eliminate this difficulty by providing for prompt credit or payment of refunds from the carry-back provisions. It gives me pleasure to say that the Treasury Department has recently fully recognized this problem and has developed a most constructive proposal intended to solve it. We hope that the Senate Finance Committee will give the Treasury proposal the recognition which it should have and adopt a provision embodying the Treasury's proposal.

4. Improvement of the Existing Postwar Reserve Provision:

I have already referred to the postwar provision which was included in the 1942 Revenue Act. We think this was a very proper provision. It has one defect which merits serious consideration. It is actually very important, though it may not now appear so. This reserve provides non-negotiable bonds which become negotiable at the cessation of hostilities. Companies such as ours will only receive any benefit from the reserve when the bonds become negotiable and we can sell them and obtain the proceeds. I believe it is fair to say that probably the cessation of hostilities will be the date when the actual need for the reserve arises in only a few cases.

The changing conditions of the war have already shown that cancellation of contracts and commencement of the conversion problem for individual companies is going to occur over a long period of time. When the German phase of the war ends, one group of contracts will be cancelled; when the Japanese phase ends, most of the remaining contracts will be cancelled, and so on. It is essential that some revision of the postwar credit be provided to insure that the proceeds will be available to each taxpayer when its need arises. This can probably best be done by providing, in the alternative, for negotiability of the bonds upon certificate by a Government agency that the taxpayer has had a large portion of his contracts cancelled.

This problem does not appear of immediate importance, but it will be vital to our economy when we get a little closer to the end of the war. We recommend prompt action on the matter before the situation becomes serious.

5. Practical Amortization of Plant Facilities:

In the Second Revenue Act of 1940, Congress provided for a five-year amortization write-off for tax purposes of the amounts invested by manufacturers in plant and equipment. This was a very proper provision based on recognition of the fact that such facilities would be useful only during the war, and that their write-off should extend only over the same period. The provision further recognized that the war might not last five years and permitted a shorter write-off, if the end of the war should occur, or if a particular manufacturer's facilities should be certified by the War or Navy Departments as not to be necessary further in the war effort. This latter provision will be of great importance if the war does end, as we all hope, in less than five years from the time some of these facilities were acquired. Unfortunately, it is not clear that the latter provision will be effective.

In the first place, it probably will not become operative until the Army and Navy provide certificates of "non-necessity". This involves a very serious responsibility which will cause them great difficulty. Furthermore, respreading amortization over a shorter period merely results in a right to tax refunds which, under normal procedure, will not be payable for years. Again, therefore, Congress should make effective this important provision which it has already fully recognized in principle. The provision could be greatly improved by furnishing manufacturers an option to respread amortization over a three-year period not to end prior to January 1, 1944, and by providing that resulting tax refunds must be made immediately, without waiting for an audit of the entire tax liability for the year. Such a change would be of substantial assistance in meeting the financial problem of the aircraft industry which is heavily involved in plant expansion with its own funds, though, of course, the Government has provided a large part of the plants now operating.

It is understood that a bill which is probably acceptable to the Army and Navy, H.R. 3712, has been recently introduced by Mr. Disney of the Ways and Means Committee in the House of Representatives which would provide for the three-year write-off referred to. We recommend that the Senate Finance Committee incorporate the provisions of this bill in the revenue bill, coupled with a further provision for prompt payment of tax refunds arising as a result of the respreading of the amortization deduction.

CONFUSION *on the Potomac*

Part II

THIS is the second portion of certain confusing testimony presented recently during a House sub-committee hearing in Washington. In reading this testimony keep in mind that this kind of hearing is the rule rather than the exception in most Washington considerations dealing with aeronautical subjects, because we do not as yet have a clear-cut National Air Policy and because so many overlapping bureaus and agencies have their fingers in the aeronautical pie. Remember, too, how such statements that appear in this and similar hearings can do untold injury to the industry and confuse even the most air-wise congressmen, who, for the most part, are sincere men, working towards the welfare of the nation and for the welfare of aviation as well. They are, however, victims of their own error in failing to provide the legislative ground-work that would once and for all eliminate the multiplicity of Federal agencies, combining them into a strong, centralized Department of Aviation staffed by competent, experienced and technical men. We submit this information in the genuine hope it will so impress the airmen of the nation they will intensify their efforts through their duly elected representatives in Congress to provide the necessary legal vehicle that alone can give us truth, progress and world supremacy in the air, without which we shall continue to stumble along the same old rocky road of chaos and confusion without a common compass course.

Plywood in Army Disfavor

The Chairman: Do you believe by using a plane of this character that your maintenance of the plane would be cut down very considerably in view of the nature of the type?

Mr. Wright: I think it would be impossible for me to judge, not having seen the plane. The only question I can raise is that the Army Air Forces have been consistently adverse to the use of wooden planes. They have recently cancelled out a good many wooden airplanes because of that, as well as other reasons, and at the present time the Training Command has officially requested the PT-19 primary trainer be taken out of production, or any other primary trainer which is also in production because of the maintenance difficulty of the wooden parts of the PT-19.

The Chairman: The cancellation was not because of any adverse desire on the part of the War Department to producing plywood ships?

Mr. Wright: I think that entered into it. The Materiel Command at Dayton was also adverse to wooden planes, correctly, or incorrectly; that is, I think a correct statement.

The Chairman: If the Department, as you state, was adverse to the construction of plywood ships, it seems rather surprising to me that they would let two contracts which will run up, I believe, to something like 250 or 300 million dollars for plywood cargo ships.

Mr. Wright: Well, there was another reason at that time when that was done, which I suggest was two or two and a half years ago, when the contract was placed, we were critically short of aluminum. It was done as a conservation measure of the supply of metal. The supply of aluminum increased until this summer, when the cancellation was made, there was an adequate supply of aluminum. Wood was said by the War Production Board to be more critical than aluminum. That was one of the major reasons for going into that particular cargo type of ship.

The Chairman: Yet the Army Air Forces let the contract with the Hughes Aircraft and Kaiser to build these plywood cargo planes?

Mr. Wright: No, sir, that contract was let, I believe, by Jesse Jones, or one of his many agencies. It was definitely turned down by both the Army Air Forces and the Bureau of Aeronautics and was placed in contract under an agreement between Mr. Nelson and Mr. Jones, or one of Mr. Jones' agencies.

The Chairman: Did your Commission or Board pass upon that?

Mr. Wright: Yes, sir.

The Chairman: So that there would have to be a report on a record of it?

Mr. Wright: The Board was quite generally adverse to the proposition, as indicated by the military members of the Board. They didn't want to go into it. They didn't, however, hold this contract out, in view of the nature of the approval that came from other sources.

The Chairman: Even though the War and Navy Departments did not recommend it, it was still authorized by other agencies, is that correct?

Mr. Wright: That is correct, sir.

Mr. Burton: Did you ever pass upon the contract of about $165,000,000 to the Hughes Aircraft Corporation for the C-76 transport plane?

Mr. Wright: They did not pass upon contracts at all, they approved putting them in the program.

Mr. Burton: Did they approve putting that in the program?

Mr. Wright: Yes, sir.

Mr. Burton: Why did they do that?

Mr. Wright: That was the same plane that I just mentioned that was the original—that was originally developed by the Curtiss, which was going to be put into production at Higgins in addition to the Curtiss operation at Louisville.

Mr. Burton: As a matter of fact, no plane of that project was ever approved, was it — did they ever build a successful plane?

Mr. Wright: When the contract was cancelled there had been about five or six planes built, one had failed in the air and I presume that some of the others had been accepted, but I don't know.

Mr. Burton: Do you know whether Higgins ever built one?

Mr. Wright: No, he did not.

Mr. Burton: Higgins did not build a C-76 plane?

Mr. Wright: No, sir.

Mr. Harness: Was that contract let on government money, for the development of it?

Mr. Burton: Do you recall when the contract was let to Curtiss for that C-76?

Mr. Wright: I don't recall the exact date, but I can guess. It was about two years ago.

Millions Spent on Untried C-76

Mr. Burton: If I reminded you it was in March, 1942, would that refresh your recollection on it?

Mr. Wright: I would not remember, even then. But if you say that is the date, I have no doubt it is. I should have thought that it was a little longer than that, perhaps.

Mr. Burton: Do you recall when aluminum ceased to be a strategic material in connection with plane building?

Mr. Wright: Very, very recently.

Mr. Burton: About when, would you say?

Mr. Wright: I should say it is only a month or two that they have really gotten out of the woods on aluminum.

Really, when I say aluminum, there are several things that must be amplified, there are several forms of aluminum that have been critical, longer than ingot aluminum. Aluminum, ingot alumimum, has not been critical for six or seven months; sheet has not been critical for five or six months, but forgings and extrusions have only come out of the critical class within the last month or so.

Mr. Burton: Can you state how it happened that Higgins Aircraft Corporation was given a contract to build C-76 planes before the blueprints were approved?

Mr. Wright: No, sir, because all of the technical matters, whether the plane is a satisfactory airplane or not, are handled by the Technical Department of Military Services; we have nothing to do with that.

Mr. Burton: But your committee did approve—

Mr. Wright: Putting it on the program.

Mr. Burton: Putting it on the schedule?

Mr. Wright: That is right.

The Chairman: In the case of the Higgins Company, the government financed the construction of the plant there, did they not?

Mr. Wright: Yes, sir.

The Chairman: As well as undertaking the complete financing of the contract, so that not only has the plant been built by the government, but also all costs have been paid by the government.

Mr. Wright: Yes, sir, yes.

Mr. Burton: That was a cost-plus fixed-fee contract with Higgins.

Mr. Wright: I don't know. I presume it was but I don't know definitely.

Mr. Elston: Was that before the plane had been tested?

Mr. Wright: That the contract was let?

Mr. Elston: Yes.

Mr. Wright: Before it was approved, it might have been—I don't know, the contract must have been let some time between around October or November of last year, because I was in England at the time it went through the committee.

Mr. Burton: As a matter of fact, isn't it true, none of the C-76 planes were ever accepted by the Air Corps?

Mr. Wright: I don't know, I think one was, and I think a few have been accepted now.

Mr. Burton: Do you recall how much was expended in building the plants for the Higgins Aircraft Corporation for the C-76 project?

Mr. Wright: No, sir, I do not have access to those figures.

Mr. Burton: You do not happen to know whether it was about $26,000,000, do you?

Mr. Wright: I have no doubt it is.

Mr. Burton: That was done before the blueprints were ever approved for the C-76 project?

Mr. Wright: Yes.

Mr. Burton: Those contracts have all been cancelled, haven't they?

Mr. Wright: Yes.

Mr. Burton: Are you still building training bombers out of plywood?

Mr. Wright: Yes, there are some still on the program.

Mr. Burton: You said a little while ago that the present plans are to stick to the models that have been approved and which are being manufactured. Doesn't it reasonably follow if you do that, that you practically cease taking advantage of any improvements in the building of planes?

Explanation of Committee Functions

Mr. Wright: The policy that I stated applies more directly to training planes where there is not so much need for improvement than it does fighting craft, which are always being changed. We are getting the very latest ones always, but in the case of trainers, it is more standard products—

Mr. Burton: If, however, you could get an improved plane at about half the cost, is there any particular reason why your committee should not approve it?

Mr. Wright: No, not at all.

Mr. Burton: Then is there any reason why your committee should not properly consider the planes which the Johnson Aircraft Company builds, or any other builder that can build a plane as satisfactory, and put that into training use?

Mr. Wright: If the plane were accepted by the customer, military services, why, the committee, of course, would consider it. We do not consider technical matters though, as to whether it is a better or worse plane.

Mr. Burton: But you must know something about it, if you are going to determine whether or not it is to be put on the schedule.

Mr. Wright: We know something, yes.

Mr. Harness: Does cost enter into your considerations at all?

Mr. Wright: No, sir, that is a matter of the Procurement Services of the Army and Navy.

Mr. Harness: You do not even make a recommendation?

Mr. Wright: We have nothing to do with that. We are involved in allocating manufacturing space to those planes which the military services say they need and want. We do not go into cost nor technical excellence of the product which they recommend.

Mr. Harness: Then you just don't have much to do with it, you just follow the suggestion of the armed forces?

Mr. Wright: As to the types, yes. What we have to do is to determine how much a given factory can produce.

Mr. Harness: Don't you think, as a matter of fact, that your committee should give some consideration to the cost of this equipment, you maintain experts to make tests of them?

Mr. Wright: Our committee?

Mr. Harness: I understood it that way.

Mr. Wright: No, we do not make tests, all that is done by the military services.

Mr. Harness: I see.

Mr. Wright: Who are the procuring agencies, and have technical staffs to do that. We are dealing with production matters.

Mr. Harness: Well, then, when an application comes before this Joint Committee by a civilian concern, if the military authorities say no, why you say no.

Mr. Wright: Not necessarily; we concurred in the opinion that it was not wise to bring in a new type or one that was going out of production elsewhere.

Mr. Harness: Do you think it is wise not to bring in a new type that the government could obtain for about one-third of the cost of those they are buying, and that new type might be even better than those they are using?

Mr. Wright: That was not one of the terms of the reference of the case, this was not being sold to a government, it was going to be sold to Mexico, or to private people, there was no question of selling it to the government in our case at all.

Mr. Harness: Well, if they could produce such a plane at one-third the cost that would function and perform just as well as those they are buying and paying $30,000 for, isn't it something your Joint Committee should consider?

Mr. Wright: Certainly we would.

Mr. Harness: Did you do that?

Mr. Wright: No, because the question was not brought to us on a cost basis, there was no discussion whether the government was going to buy this plane. Mr. Johnson made application for priority for sale to Mexico and to private individuals, not to either the Army or Navy.

How to Offer an Airplane

Mr. Burton: If you were engaged in the manufacture of airplanes as the Johnson Aircraft Company is, just how would you proceed to get the government to accept that plane and manufacture it and thereby save all this to the taxpayer?

Mr. Wright: I would first, insofar as the Army Air Forces are concerned, get in touch with the Materiel Command at Dayton, Ohio, and ask for them to test the plane and try it out for whatever purposes he said it was satisfactory.

Mr. Burton: Now, the Materiel Command is under General Eccles, is it not?

Mr. Wright: Well, it is directly under General Arnold. General Arnold has a staff in charge of materiel, maintenance and transport.

Mr. Burton: You would go there first?

Mr. Wright: Yes, sir.

Mr. Burton: And then what would you do after that?

Mr. Wright: You would try to sell the Army the plane.

Mr. Burton: Well, to whom would you go to sell the Army the plane?

Mr. Wright: You would go to General Carroll or to Colonel Cook, who are the two officers at Wright Field that deal with technical qualifications of planes.

Mr. Burton: And then would you ask them to make a test of this plane?

Mr. Wright: Yes, sir.

Mr. Burton: Now suppose they approved it, then where would you go?

Mr. Wright: I think you would make a proposition to the procurement officer at Wright Field for the sale of the planes in whatever quantity might be involved.

Mr. Burton: Now if he decided that the plane should be produced, from whom would the company get approval, from your committee?

Mr. Wright: Oh, no, get approval from General Arnold, first General Eccles and then General Arnold.

Mr. Burton: Then the planes could be bought by the government?

Mr. Wright: Then the plane could be bought by the government, that is right.

Mr. Burton: Just where would your committee come in?

Mr. Wright: Our committee would come in on the scheduling of the production of the plane, whether or not it could be produced according to the claim of the manufacturer, that he could get out five a day by next March; we would appraise that and put it on the schedule according to whatever agreement was reached between us and the manufacturer on what was a reasonable schedule.

Mr. Burton: Then there really was not any purpose of his coming before the committee as he did to get the schedule because he had not received approval from Wright Field.

Mr. Wright: He had not asked for approval from Wright Field, so far as I am aware.

Mr. Burton: Don't you think it would have been a good idea if this letter that was written him might have been expanded a little further?

Mr. Wright: Perhaps it would have been a good thing.

Mr. Burton: That would help people in small war plants get business, wouldn't it, if you just took a little time to explain to them—

(To be concluded next month.)

Plywood Outlook "Complicated"

The plywood industry faces a complicated situation in 1944, whether we have peace or war, says Lawrence Ottinger, president of United States Plywood Corporation. Demand for aircraft plywood has decreased substantially in recent months and cancellations have occurred in large quantities. Though much aircraft plywood has been used in gliders and trainer planes, its use for aircraft generally never reached anticipated proportions because of lack of design and necessary technical data at the beginning of the war, while England, on the other hand, was ready with the "Mosquito" bomber and other planes and parts of planes, such as the Avro Anson fuselage, Ottinger said. From present indications, there will be no great demand for plywood in military aircraft except for certain molded parts and other special parts for which plywood is particularly adaptable, Ottinger added.

Conservation Reports Suspended

The Army and Navy Operating Committee on Aircraft Materials Conservation has announced that Conservation Directive No. 11, requiring submission of periodic reports on aircraft industry conservation activities, has been suspended and subject reports are no longer required. The Operating Committee also announced recently that the availability of phenolic resins for use in aircraft and aircraft components has shown considerable improvement since issuance of Conservation Bulletin No. 2, dated May 14, 1943.

One of a Thousand

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WMC Labor Controls On Coast Called Success; Turnover Improving

The War Manpower Commission in San Francisco last month announced that the "strictest labor controls ever applied in America" have worked "successfully" on the West Coast during recent months, and labor-management committees were praised by Regional WMC Director William E. Hopkins for their efforts in boosting production. In eight months, he said, 189,000 workers were shifted from non-essential to critical war jobs. Meanwhile, the Aircraft War Production Council reported that member companies are still losing about 17,000 workers a month through turnover. But this was better than usual, for previous AWPC statistics had the figure at 20,000.

Breech Cites Need of Fair Treatment for Postwar Conversion

Conversion from all-out war production is not probable for the aircraft industry during 1944, although some industries will resume civilian goods manufacture as raw materials and manpower become available during the year in which victory over Germany is expected by many leaders.

So says Ernest R. Breech, president of Bendix Aviation Corporation. In all probability, he added, the aircraft industry will be devoted 100 per cent to war production throughout the entire year "and longer." The WPB has already announced the 1944 tonnage output of aircraft is scheduled to be 325 per cent greater than in 1942 (output in 1943 is believed to have been 140 per cent over 1942 in tonnage).

Breech, who appealed for public efforts to safeguard the future of aviation by legislation to ease the eventual conversion to peacetime operations, pointed out in a year-end statement that the United States "will continue to need an air force second to none" and will want to develop its bright prospects in postwar air transport. "The aviation industry can discharge these responsibilities successfully only if wise and fair policies are adopted governing the renegotiation of its prices on war contracts, the termination of these contracts and the conditions of its conversion after hostilities have ended."

New Name, By-Laws Talked for Aero Chamber

A possible change in the name of the Aeronautical Chamber of Commerce and possible limitation of membership to manufacturers, with executives of the leading aircraft manufacturing companies actively participatng, were forecast at a meeting of Chamber members recently. "Aircraft Industries Association" was a tentative suggestion for a new name more clearly to identify it as a trade association representing aircraft manufacturers, James P. Murray, president of the Chamber and vice president of Boeing Aircraft Company, said. A special meeting of members to make necessary changes in by-laws and elect a new board of governors was to be held later. The new board is expected to include heads of six West Coast and six East Coast manufacturers of airframes or engines, two manufacturers of aircraft parts and accessories and one representing other members. It is proposed to hold regular meetings alternately on the West Coast and East Coast coinciding with meetings of the Aircraft War Production Council.

Boeing Reaches New Output Peak, Cuts B-17 Price in Half Despite 1943 Production Crisis

Flying Fortress Components in a Boeing Factory

One of the outstanding industrial records accomplished during 1943 is that of the Boeing Aircraft Company. President P. G. Johnson has revealed that the firm (1) reduced the contract price of Flying Fortresses by about one-half since Pearl Harbor, and on one 1943 contract alone voluntarily reduced the established price by $120,000,000; (2) manufactured 92 per cent more Fortresses in December than in January of 1943 and ten times more than were built in the month preceding Pearl Harbor, and (3) increased production efficiency so that Fortresses are built today in one-third the man-hours required at Pearl Harbor and in only 10 per cent of the man-hours required for the first bomber of the firm's initial production contract in prewar days. (In 1940 a total of 161,000 direct workers would have been required to meet the December, 1943, Fortress schedule at Boeing. Actually, less than 25,000 did the job.)

In the face of military schedules which called for more deliveries each month, Boeing had for a full year to get along without any increase in manpower. Schedules were met, however—by new production methods and constantly increased plant efficiency. But from May until September further increased deliveries were not possible without more manpower. Then the War Labor Board approved a job evaluation plan which raised Boeing wages to a par with shipyards and other neighboring industries, and Boeing opened branch plants in five Western cities and sent worker-hiring teams into the Midwest. In October, November and December, production was accelerated until the Army's schedule was overtaken. Boeing even made up for slack during the preceding four months.

Boeing's schedules are still being increased, and Johnson says improved employment conditions have not changed sufficiently to insure meeting the Army's increased demands for 1944. Especially pressing will be the requirements at Boeing's Renton division, where full quantity production will be reached during 1944 on the huge B-29 super-bomber.

Gains in Airplane, Engine, Propeller Output Listed by C-W

Reviewing Curtiss-Wright Corporation accomplishments during 1943, President Guy W. Vaughan said the Airplane Division in eleven months manufactured 40,353,352 pounds of airframes and parts, an increase of 58 per cent; the Wright Aeronautical Corporation reached a peak monthly rate of engines totalling 3,000 per cent more than its volume in September, 1939; and the Propeller Division increased its output 50 per cent over 1942.

Wright engine output in 1944 will be double that of 1943, he said. The year was highlighted by development of the 2,200-hp. Cyclone 18 and the debut in battle of the Airplane Division's Helldiver dive bomber, a carrier unit sinking two Jap warships, probably sinking two others and damaging a fifth at Rabaul.

Southern Adds Facilities To Dallas Factory

Southern Aircraft Corporation of Dallas has expanded its facilities. Forty thousand square feet of addition to the main factory form one unit occupied last month. Other additions include a new building for receiving and warehouse; expansion of the old shipping and crating building for jigs and fixtures and tool and die departments; expansion of the wood and pattern shop; expansion of the processing building; enlargement of the boiler house to accommodate mechanical maintenance, carpenter shop and metallurgical laboratory, and expansion of medical, cafeteria and washroom facilities.

Southern is engaged in the manufacture of important aircraft material on prime orders and also is subcontractor to several major aircraft firms.

33,000 P&W Engines Delivered by Buick

Since the war started, the Buick Division of General Motors Corporation has produced enough Pratt & Whitney twin-row Wasp engines to power more than 8,000 Liberator bombers, three-fourths of which were manufactured during 1943, Harlow H. Curtice, head of the Buick division, stated. Curtice declared Buick is now a leading producer of aircraft horsepower and the largest producer of the P&W 1830 engines for the Liberator bomber program. Shipments to the Army Air Forces since January, 1942, have aggregated 33,027 engines, of which 8,401 were shipped in 1942, and 24,626 in 1943.

Millionth Propeller Blade Made by Hamilton Standard

Production of its one-millionth propeller blade was marked by Hamilton Standard Propellers at its East Hartford, Conn., plant during December. The million blades included production of Hamilton Standard's four licensees, Nash-Kelvinator, Frigidaire, Remington Rand and Canadian propellers, and they were counted from the first controllable-pitch propeller in 1932. Sidney A. Stewart, general manager of Hamilton Standard, stated it had taken ten years to build the first million blades, but the second million would be completed in a little over a year.

Sperry Arranges Credit

Thomas A. Morgan, president, announced the Sperry Corporation has arranged a "V" credit financing totalling $125,000,000 with fifty-seven banks headed by Bankers Trust Co., of New York. Sperry has completed its expansion program, and has announced some terminations involving mostly forward commitments, but new contracts are still being received on recent developments, particularly in radar and other electronic devices.

Horner Appointed United Aircraft Head

The board of directors of the United Aircraft Corporation announced in December the election of H. Mansfield Horner to the presidency of the company. Eugene E. Wilson, former president, will devote all his energies to the office of vice chairman of the board. Horner was formerly vice president in charge of manufacturing and general manager of the Pratt & Whitney Aircraft division. His elevation to the presidency makes him one of the youngest executives in the industry to hold so important a post. He is forty years old and has been with the Company seventeen years.

Simultaneously, the board announced the appointment of Raycroft Walsh as a vice chairman of the corporation and William P. Gwinn as acting manager of Pratt & Whitney.

Frederick B. Rentschler, in making the announcement of the new changes, issued the following statement:

"It is believed this realignment of our principal officers will tend to strengthen the general executive department and also operations. It continues United's fixed policy of advancing personnel within the organization. It will also serve to bring along our younger executives to positions of greater responsibility and at the same time will provide our mature senior personnel with the opportunity of devoting their efforts to the general business affairs of the company, particularly in the correlation of research and development programs of all United Aircraft divisions, to insure timely and effective planning in anticipating future requirements."

Norton Sather Succeeds Hayward at Miami

Norton C. Sather has assumed duties as general manager of the Miami Division of Consolidated Vultee Aircraft Corporation. He succeeded W. A. Hayward, who has retired. Following his graduation from the University of Washington in 1928, he joined Boeing Aircraft Company in Seattle, for which he was assistant producton manager when he joined Vultee Aircraft, Inc., at Downey, Calif., in 1941. Last July he was appointed to the staff of C. W. Perelle, Convair vice president in charge of manufacturing, at San Diego, from which he was transferred to Miami.

Eclipse-Pioneer Output Expanded 200 Times

Production of over seventy basic types of aircraft instruments and engine components at a current rate of 375,000 units per month has been achieved since the start of the war by Eclipse-Pioneer division of Bendix Aviation Corporation and its subcontractors, Raymond P. Lansing, vice president, announced. Measured in dollar volume, total monthly output has increased seven times and unit deliveries 200 times over 1941 levels. Eclipse-Pioneer has added thirty-five new subcontracting firms since the war.

More Mexicans for NAA

North American Aviation at Dallas, Texas, has revised its employment policy affecting Mexican aliens, Malcolm Ross, chairman of the President's Committee of Fair Employment Practice, announced. In line with the adjustment, the FEPC stated the Plant Security Division of the Air Corps in the Texas area will clear applications of aliens for employment without delay. North American has hired more than fifty Mexicans who were not citizens since the committee first acted to give aliens who are loyal to the country employment in war industries.

Navy Orders Hollow Steel Propellers

A new contract from the Navy for a large number of hollow steel propeller blades has been received by the American Propeller Corporation, Toledo, subsidiary of The Aviation Corporation, William F. Wise, president of the propeller company and executive vice president of AVCO, announced.

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AIRLINES...

Texas Aviation Laboratory Gets Significant Experiment as Essair Sets Up Feeder Operations

Texas, where air transport service is an urgent necessity and where significant developments in commercial, civilian and military aviaton have been proved in years past, last month was selected by the Civil Aeronautics Board to serve as the nation's laboratory for feeder airline operations. The experimenter will be Essair, Inc., whose Dallas owners applied nearly four years ago for the operation and who were authorized by CAB to carry passengers, mail and property between Amarillo and Houston via Lubbock, Abilene, San Angelo and Austin.

Essair's temporary certificate is unique. Not only does it remain effective for three years, but it was the first "feeder" authorization from CAB, which in recent months has been swamped by hundreds of short-haul proposals. Wide interest among airlines and others was attracted by the decision, and observers believe it portends action to open up feeder possibilities throughout the nation.

Essair is a small independent firm which, as of January 1, had no airplanes, no pilots, no ground installations. It was set up before the war, but became a "paper" airline in 1939 pending action on its application and clarification of war needs. Its president, Sam W. Marshall, a Dallas flyer and engineer, went into the Army and is presently a Major in Ordnance with the Air Forces in England. While he's away his post is held by his uncle, General R. C. Marshall, Jr., retired officer, who headed the Army's construction corps in World War I. E. Y. Holt of Dallas is general manager and vice president.

May Use Single-Engine Planes

Reached in Washington by telephone, Holt told SOUTHERN FLIGHT that Essair plans "immediate" operations over the 650-odd miles of Feeder Route 64. He isn't worried about airplanes, as sufficient used equipment had been spotted some time ago and, if necessary, Essair will use single-engined planes until twin-motored medium transports are acquired. He said personnel will be no problem, either. The firm is amply financed. "I'm on my way to Texas now and we'll be operating just as soon as I can co-ordinate the plans on the spot," he said, adding that one 4½-hour schedule each way per day was his immediate goal. Essair's primary loads will probably be military personnel and property, he said, pointing to the huge concentration of Army operations along the route. "They need a feeder operation out there and we're going to give it to them," Holt said.

PCA Attacks State Franchise for Greyhound Air Service in Michigan

Pennsylvania-Central Airlines recently challenged the authority of the Michigan State Board of Aeronautics to grant a charter to the Great Lakes Greyhound Skyways, subsidiary of Greyhound bus lines, to operate intrastate helicopter service, by petitioning state authorities to set aside the franchise to operate between Detroit, Flint, Saginaw and Bay City. Pennsylvania-Central pointed out it presently had a Certificate of Convenience and Necessity granted by the Civil Aeronautics Board to operate between the cities and had operated regular schedules prior to the war, although its service between these cities was suspended due to the war. PCA also charged that the Greyhound bus line now operates ground transportation between these cities and contended granting of a certificate to operate air transportation gave the bus line a transportation monopoly. Authority and jurisdiction of the state board were questioned.

Southwest Airways Carries Million Pounds Over Army Feeder System

More than one million pounds of military cargo and mail were flown by Southwest Airways during the first year of its all-Army feeder operation, without a single pound of shipments lost or damaged, the company announced recently. Originally established by the San Bernardino Air Service Command, Southwest's cargo division now operates in connection with the ASC's 39th Air Freight Wing and the Air Transport Command, flying high-priority Army freight and mail from central supply depots to West Coast Air Forces installations. Southwest's feeder operations have reduced the time previously required for delivery of Army priority freight at many bases as much as forty-eight hours.

OWI Cites Military, War Programs of Commercial Airlines

Military tribute to the airlines, together with disclosures of several newly-revealed examples of airline war performance, was paid in December by the Office of War Information in a release called "U. S. Civil Airlines in the War."

Maj. Gen. Harold L. George, commanding the AAF Air Transport Command, commented: "If it had not been for their (the airlines') wholehearted co-operation, it would have been nearly impossible for us to carry on the job in the way it has been done."

Retaking of the Aleutians would have been postponed for months if air transport had not been able to fly in men and cargo quickly and in great quantity, the Navy said.

The OWI report pointed out that the Navy's Air Transport Service and the Army's Air Transport Command operate four principal world airways to "everywhere," with innumerable branch and feeder lines. One route spans the North Atlantic nonstop and in stages; a second by stages extends from the southern United States to Africa, the Middle East, India and China; Number Three serves the South Pacific from Southern California via Hawaii, and the fourth leads to Alaska and the Aleutians.

In addition to furnishing airplanes, personnel and route operations, the airlines also have trained additional personnel for the military, and some have contracts for the maintenance and modification of military equipment.

By December 3, the Army had returned twenty-one DC-3's previously leased from the airlines, and had resold five others to the airlines. The Navy had returned three flying boats to Pan American Airways. A total of 244 airplanes had been bought or leased from the airlines by the Army and Navy, leaving the commercial fleet with less than half its prewar strength. New planes under construction and on order, intended for the airlines, were taken over. But during the first

(Continued on page 64)

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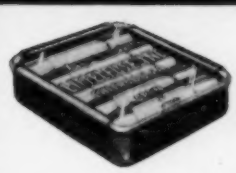

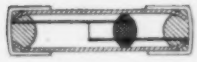

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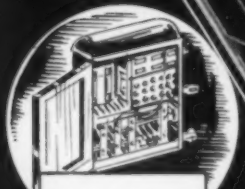

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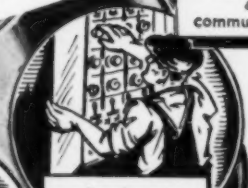

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Oversize Rivet

Prevents Dinging

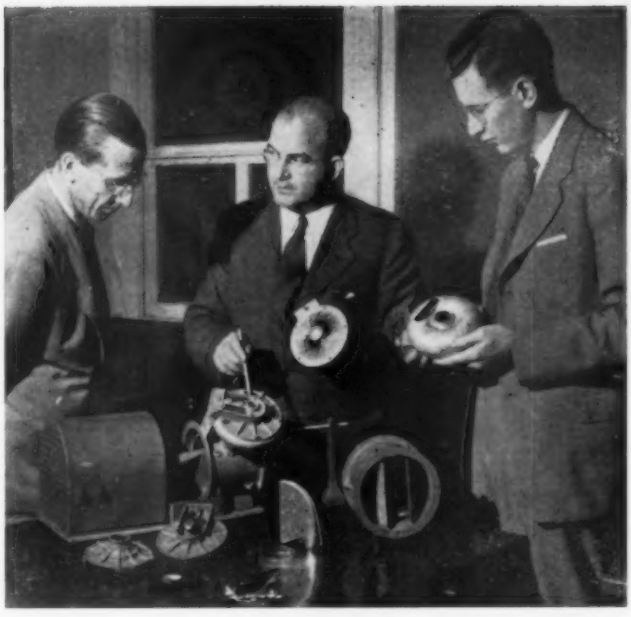
An oversize rivet set 2½" in diameter that is said to eliminate the danger of dinging thin skins is being manufactured by the Aero Tool Company, Burbank. Forged from tool steel and heat-treated, the grain flow of this set is said to have impact resistance and minimum fracture possibility. A smooth finish on the crown surfaces protects thin skins from dents and abrasions while riveting. An extra large face and the light weight of the set is said to reduce rejects and speed flush riveting operations.

Fuse Extractor Post Improved

Announced by Littelfuse, Inc., Chicago, is a new fuse extractor post construction for 3 AG (1¼"x¼" dia.) fuses. Anti-vibration side terminals are mechanically connected by electrical welding to the metal shell inside the bakelite body and backed by a soft solder. The new welding process makes the terminal connection in effect one piece, integral with the metal parts and unshakable. The terminal is also said to be proof against heat. A specially designed grip prevents the fuse from dropping out and it can be removed from the knob only by hand.

Light Flooring For Planes

Technical Ply-Woods of Chicago has perfected a new lightweight plywood flooring for aircraft with a thickness of less than three-fourth-inch and a weight of about .85 of a pound per square foot, capable of supporting an ultimate load of 800 pounds per square foot on eighteen-inch spans. Called "Hollo-Tech," it is manufactured in panels up to twenty-five feet long and four feet wide. The core is of narrow grid strips.



Automatic Rotor Controls Temperature of Flowing Air

A new device called the Temp-Turb which automatically controls the temperature of flowing air in ducts, has been announced by General Electric, to regulate temperature in cabin warming, windshield defrosting, wing deicing and carburetor air intake for planes. Temp-Turb develops power on the windmill principle, from the velocity of flowing air. The rotor, resembling a fan, has blades which are pitched so the rotor turns in a clockwise direction. When the flowing air is warmer than desired, the blades reverse the pitch and the rotor turns counter-clockwise. When the air is at desired temperature control point, the rotor stops. It is designed to operate in temperatures ranging from minus 70 degrees F. to plus 250 degrees F.

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Repudiation of Controversial Lea Bill Now Complete As NAA and NATA Take Action Opposing HR 3420

Complete and thorough repudiation of the Lea Bill was contained in a statement issued recently by the National Aeronautic Association opposing HR 3420 in its present form. The statement followed rumors and misrepresentations in recent months picturing the NAA as favoring the Bill, which has remained in the House Rules Committee for some time now. The NAA statement listed in detail its reasons for opposition, as outlined by a subcommittee appointed at the Oklahoma City Aviation Clinic (SOUTHERN FLIGHT, December, 1943).

Said NAA: The Bill seeks "unjustified" extension of Federal control over matters formerly and properly reserved to the states, such as private flying, non-scheduled operations, fixed-base operations, and intrastate commerce . . . the Bill seeks "unfair discrimination in favor of existing air carriers" and against newcomers to air commerce . . . the Bill provides for the government's "unwarranted entrance into the field of private enterprise, to wit, the educationg and training of pilots, mechanics, etc."

Last month, also, the National Aviation Training Association, formerly rumored and misrepresented as favoring the Bill, repudiated HR 3420.

The Air Transport Association, composed of airlines, has distributed elaborate propaganda seeking passage of the Lea Bill.

100,000-plane Goal for 1944

Plane production was expected to reach 9,000 or more during December, making a total of more than 85,000 planes of all types produced in 1943, War Production Board officials stated shortly before the first of January. A total of 76,876 planes were produced in the first eleven months of 1943, and nearly 160,000 planes have been produced since the beginning of the defense emergency in 1940, War Production Board reports stated. Schedules for 1944 call for over 100,000 planes, with a monthly production peak of 10,000 planes to be reached in the first half of the year.

Alabama Authority Clarified

Alabama's Acting Attorney General William N. McQueen has ruled that state's Public Service Commission does not have jurisdiction over an application by Waterman Airline seeking an intrastate certificate. He said the state's Aviation Commission is empowered to grant certificates for intrastate air operations.

Postwar Planning Expert Named

Dr. F. A. Buechel, economic analyist of the Bureau of Business Research of The University of Texas, has been appointed Acting Regional Business Consultant of the Department of Commerce for the Southwest Region, Secretary of Commerce Jesse Jones announced. Dr. Buechel, whose first assignment for the Department of Commerce is on Postwar Planning in the Southwest Region, will serve on a dollar-a-year basis, and his status with the University will not be changed.

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Arnold Gets Collier Award, First Plane's Return Told, at Dinner

Presentation to General Henry H. Arnold, Army Air Forces commanding general, of the Collier Trophy and announcement in a message by President Roosevelt that the original Wright airplane would be returned to this country and installed in the Smithsonian Institute featured 40th Kitty Hawk anniversary dinner in Washington last month. Orville Wright, the honored guest, was there and received praise from many quarters. Major Lester D. Gardner, chairman of the Institute of Aeronautical Sciences, arranged the affair and Secretary of Commerce Jesse Jones presided. Ceremonies scheduled at Kill Devil Hill, the historic site, were snowed out.

Parks to be Ercoupe Distributor in Nine States

Parks Air College at East St. Louis, Ill., has plans for the sales distribution of the Ercoupe airplane in Ohio, Illinois, Indiana, Missouri, Kansas, Iowa, Nebraska, Alabama and Mississippi. In addition, "other planes and types of equipment considered airworthy and economically sound" will be considered in developing the Parks fixed-base operations plan. Recently over 3,000 persons visited the college's grounds to see and have demonstrated to them four Ercoupes on display. Fifteen sales representatives (three from each of the five Parks schools) secured deposits for priority delivery of the planes after the war ends.

OWI Cites War Progress for Airlines

(Continued from page 60)

six months of 1943 more airmail was carried than during all of 1941. Air express during January-June, 1943, totalled 28,803,546 pounds, as compared with only 7,804,508 pounds for the same months in 1941. A total of 1,428,888 passengers were flown within the U. S. by the airlines during the first six months of 1943 as against 1,567,608 for the same 1941 period. In 1941 each transport averaged eight and one-half hours of flight operations per twenty-four-hour day; in 1943 it averaged between ten and twelve hours daily. The average weight of individual shipments increased from about eight pounds in 1941 to fifteen and one-half pounds in 1943.

Airlines cited for sharing in the war program are Northeast, Mid-Continent, Eastern, Colonial, United, National, Pennsylvania-Central, Western, TWA, Continental, Delta, Northwest, Chicago & Southern, Braniff, Inland, American, All-American, Hawaiian, Pan American, American Export and Pan American-Grace.

Braniff Enters Mexican Port

Braniff Airways was recently granted an exemption from provisions of the Civil Aeronautics Act to serve Nuevo Laredo, Mexico, as a co-terminal point for its present route to Laredo, Texas. Planes of both Compania Mexicana de Aviacion and Braniff will operate from the Nuevo Laredo airport, providing connecting service between United States and Mexico. Braniff's operations to and from Laredo, Texas, continue unchanged.

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By TONY HAGMANN Field Representative

Dallas, Texas . . . A much cussed and discussed man is Bill Jasper—Priority Board. We wish to go on record as saying he's plenty O. K. and that goes for Capt. Robb, too. We'd hate to have to tell folks "no priority" and so do they. They'd rather say yes.

Weldon Williams reported a "heavy scotch front," at Christmas time. Mmm—Where? Corporal Tommy Kirk, whose "Everlovin' " graces the Hampton Airport office, wuz in town. He said everybody up at his camp in Idaho reads SOUTHERN FLIGHT. Very smart people. Ole Bob Spradlin, in the walkin' (or maybe fixin') Army in Wichita Falls, reports that he'd be willin' to fly anything with wings, he's so air lonesome. Frank Buck got the same detail and you know that Frank has been flyin' some mighty fine stuff. . . . A photographic ship ain't no kite, 'specially where he's been flyin' one. Sounds like wasted talent in the deluxe model.

Lt. George Thieriot, from Amarillo, is now a 5th Ferry Pilot. . . . "Goody" Goodwin got his soup card (fancy talk for instrument ratin') and Lt. Jim Peterson reports that if you think it's cold here, you should go to his home state of Wisconsin.

In town . . . Some "No Speak Englishers," only they do for sure, Michael Kadenacy, Miguel Ravinovitch (the Colombian Cossack), Max Garavito and George Rubissow. "Muy importante" in this engine business. They came for a look-see at the Guiberson Diesel which flies about the countryside like a fine bird. Consensus . . . "we like" . . . Lester Deutsch, president of Aero Tool in Burbank stopped over, said "Howdy" . . . and another well-known to the engine folks was here, Joe Keeley, the Pratt and Whitney answer man.

Miss Campbell

From Tulsa . . . Jonnie Lairmore reports that they are real proud of local gal Patricia Campbell. She was awarded the J. M. Bleyer trophy which was donated by Mrs. Chester Bleyer's son, to the girl showing outstanding aviation progress and aptitude during the year. Pat, president of WNAA's Tulsa chapter, flies her own plane, made forty-two XC flights in three months, now has over 200 hours. Tulsa also brags about seven WNAA pilots in the Star Dept.—Grace Stevenson, Margaret Endacott, Mildred McLelland and Gladys Brennaman. All in the WASPS 'cept Grace. She's flyin' for Britain. All this at a banquet where John Harding, Jr., told members about his flight around the world twenty years ago, which was a real feat. Charles Short gave out with some aviation talk and everybody was happy.

Ft. Worth . . . and Margaret Bowman tells us about "twenty-three former hedgehoppers who are flight instructors at Hicks. Unsung heroes of the war" . . . Learned to fly on their own dough, now riding the sequence with the "hot cadet pilots." Ft. Worthers at Hicks are: J. C. Parker, Barney Reynolds, Willard Simpson, B. B. Nelms, S. W. White, Maurick Spinks, S. W. Kent, John W. Winter, D. D. Dunning, G. L. Eades, John F. White, R. J. Baird, Mont O. Roper, LaRae Gantt, C. J. Bovell, Tom F. Perude, B. L. Loughry, Noble Acuff and Rodney Napier, F. B. Estes, Tommy Neyland, J. L. Haines and D. H. McMillen. The last four "have went away" . . . Airline, schools, etc. Margaret said, "We won't be surprised if Bill Fuller and Herbert Joseph bring at least one of the nation's better known airplane designers for a session with the new NAA Chapter in Cowtown."

Shreveport, La. . . . Marjy Hardman from Stovall Field tells us that the place is a beehive, only the bees are busy gals working to meet requirements for the WASPS. Stovall Field has had a nice crop of new private pilot tickets. Sam Brown, Bruce Williams, Wayne Gunn, Earl Granville Turner and Charlie Mounce first up and Sue Wilson,

(Continued on page 67)

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The name "IRVIN" on the harness means the chute is produced in an Irvin Factory with over 20 years of experience and skill in chute-making. Literature can be had by school or training executives for the asking. Address Main Office, Buffalo, N. Y.

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Founded in 1920. There is only one qualification for a life membership: in an emergency men and women who have saved their lives with Irvin Air Chutes. The word CATERPILLAR and representation of a caterpillar are registered trade-mark features of Irving Air Chute Co., Inc. We are anxious that the records of the Club be kept as complete as possible in the Club Register and members, upon enrollment, will receive a caterpillar token with the name inscribed thereon. Communicate with our Main Office.

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Some CAP Majors Get Rank of Lieut. Colonel

A number of Wing Commanders last month were promoted from the CAP rank of Major to that of Lieutenant Colonel. A complete listing of those honored was not immediately available to SOUTHERN FLIGHT, and it was not known how many were elevated in rank. The complete list will be published in these columns as soon as it becomes available.

Service Ribbons Authorized

Service ribbons of white, ½ inch in length and 1½ inches in width, with the Civil Air Patrol insignia imposed in the center in natural colors, have been approved for CAP members by the War Department and Quartermaster General. The ribbons can be worn only by CAP members and only on the CAP uniform. Members with 250 actual working hours and one year minimum enlistment will be entitled to a white ribbon with green stripe; those with 500 working hours and eighteen months' enlistment will receive a red-striped ribbon; those with 1,000 working hours and two years' enlistment will receive a blue-striped ribbon. Only one ribbon can be worn at a time, and the highest ranking ribbon will be worn by members acquiring more than one ribbon as requirements are fulfilled. The working hours required are not restricted to flying time, but include all actual working hours with CAP, active-duty service, active-duty flight service and actual working hours in the field.

Permission to wear ribbons is to be granted by Wing, Group or Squadron Commanders, and unit supply officers must receive written instructions from Unit Commanders as to quantity and type of ribbons to be ordered.

Selling Bonds and Aviation, Too

The St. Paul, Minnesota, Squadron 711-1 conducted a flight war bond drive recently in which $3,500 was collected by giving a free airplane ride to all persons buying a war bond of $50 or more. The CAP drive was carried on following the official general war bond drive in order to reach those who would not buy without special inducement, Sgt. Albert M. Kueffner of the squadron stated. The airport which the government permitted the squadron to use was sixteen miles from the downtown area of the Twin Cities. Despite this, forty-three airplane rides were given on two Sundays between 10:00 a. m. and 4:00 p. m. One purchaser, a man ninety-one years of age, had his first airplane ride, and his enthusiasm was so great he was offered and accepted a second ride from O. A. Brandt, Captain of the squadron, Sgt. Kueffner said. Captain Brandt and Lt. Alvin D. Hesselgrave each furnished an airplane, gasoline and four hours piloting time.

YOU Can Answer This $64.00 Question!

How and why should the Civil Air Patrol be made permanent?

During March, April and May SOUTHERN FLIGHT will pay a $64 CASH AWARD for the best letters answering the above question.

Right now you have and everyone else has but one interest—to win the war.

But aviation was built on vision. It is natural to think of aviation in the postwar world, no matter how long and hard the road to victory.

Many people believe the Civil Air Patrol should continue on after victory—as a tremendous reserve pool of airmen and airplanes . . . a guarantee that we'll never again be caught napping.

Dime Per Word For Your Ideas

Would *you* like to see a postwar Civil Air Patrol? If so, write us a letter, telling in 640 words or less *why* and *how* you think the organization should be carried over into peacetime.

For the best letter we receive each month, SOUTHERN FLIGHT will award $64.00 in CASH. Winning letters will be published each month, the first to appear in the March issue as the best among those to be submitted on or prior to February 15th.

No Strings—Just Use Your Head

You don't have to buy anything, clip any coupons or make any promises. Just give the idea some down-to-earth thinking and put your thoughts in a letter to us. Letters competing for the March award should be in our hands by February 15, when the selection will be made. The April winner will be selected on March 15 and the May winner will be selected on April 15.

You don't have to be a member of the Civil Air Patrol to win. We know many persons in aviation who are vitally interested in CAP but who are not yet members. But if you are in the CAP, please identify your unit on your letter.

Send in your letter today!

The Editors of SOUTHERN FLIGHT,

P. O. Box 750, Dallas 1, Texas.

CAP Coastal Patrol Lauded by Army and Navy as Civilian Anti-Submarine Search Terminated

Now it can be officially told—the spectacular record chalked up by the Civil Air Patrol anti-submarine operations established shortly after Pearl Harbor, which not only released combat trained personnel and scarce military airplanes for duty abroad, but proved to be an effective link in our hastily improvised chain of defense against Nazi undersea wolf packs.

The announcement that all Army participation in anti-submarine activities, including the Civil Air Patrol, had been discontinued was made by the War Department last month. A review of the CAP anti-submarine record not only represents a brilliant chapter in U. S. civilian aviation history, but silences forever the skeptics and critics who said "it couldn't be done."

The War and Navy departments give CAPCP credit for the following:

- 24,000,000 airplane-miles flown over coastal shipping lanes.
- 173 enemy submarines sighted, damaged, reported or sunk.
- 363 survivors of ship sinkings or aircraft crashes spotted and saved.
- 36 bodies sighted and reported.
- 17 floating mines charted and reported.

In this work, twenty CAP members lost their lives in forced landings and six in crashes on land. Seven were seriously injured and ninety planes were lost or damaged beyond repair.

The Navy has previously announced it has sufficient planes and crews to assume full responsibility of anti-submarine operations. For the Navy, Admiral E. J. King, Commander-in-Chief of the United States Fleet, in a letter to the Chief of Staff, United States Army, General George C. Marshall, said the following regarding CAP's volunteers on Coastal Patrol:

"I request that you express to them a 'Well Done' for their enthusiastic, loyal and constant co-operation in combatting the submarine menace, patrolling our coastline and assisting the locating of survivors and ships in distress."

Admiral Adolphus Andrews, Commander Eastern Sea Frontier, said:

"Your unit has rendered invaluable services to this command in fulfillment of its war mission of protecting shipping and combatting the submarine menace. The tasks performed by CAPCP have been many, including anti-submarine patrols, escort missions, searches for known or suspected submarines, and assisting in rescues after marine and aerial casualties.

"In the performance of these tasks there has been displayed a skill, energy, resourcefulness, and disregard for danger which are in the highest tradition of the American armed forces. Now on your departure from the Eastern Sea Frontier I extend to you and to your men my thanks for your co-operation and wish you all the greatest success in your next assignments. Well done!"

Flying personnel and equipment of several of the Coastal Patrol bases are being pulled out of their former locations to maintain their unit identity on new work in other areas.

Important inland work of CAP for the Army includes the Southern Liaison Patrol, along the Rio Grande; the Second Air Force Courier Service which flies some 25,000 miles daily on regular routes and schedules throughout the West; other courier establishments at many points; and a growing mileage of "tracking" work to give aiming practice to anti-aircraft gun and searchlight crews.

PORTS OF CALL

(Continued from page 65)

Jeral Salek and Marion Nelson second. Charlie bought a Luscombe Silvaire, Irene Minter has gone back to Sweetwater, Willis Houck got his "soup card," under Doc Watson's training, Izzie Horowitz got his instructor's rating and is using it right here . . . and Ernest Bowden is now at Badgett's Flying School at Municipal . . . all in all a very nice go. P. S. We wish we had been "in" on Stovall's Christmas party, as we understand everybody received just what they wanted.

Miami, Florida . . . We hear that Embry-Riddle has on the payroll one of Baltimore's erstwhile first ladies in aviation. Mrs. Bill Kniesche, Katherine from now on, is instructing Navy Fledgelings in the elementary course Embry-Riddle puts out. She is a jam-up instructor and when this thing is over intends to buy and fly a Grumman amphibian over the land and waves. Number one Miami special.

Kansas City, Kansas . . . Head of the test pilot's department, addressed at North American Aviation, Inc.'s, K. C. plant, you may find Paul Thornbury most any day. He has five new pilots, that is, new to this job. They are Arlie Simmonds, who used to wave a baton; James Redwine, former ferry pilot; Ron Kendall, ex-manager of a flight school; "Mel" Coeur, ex-Army and ex-Cessna test pilot, and Ray Johnson, who flew with Inland Airlines up in the northwoods country. They give the new B-25's the well-known business.

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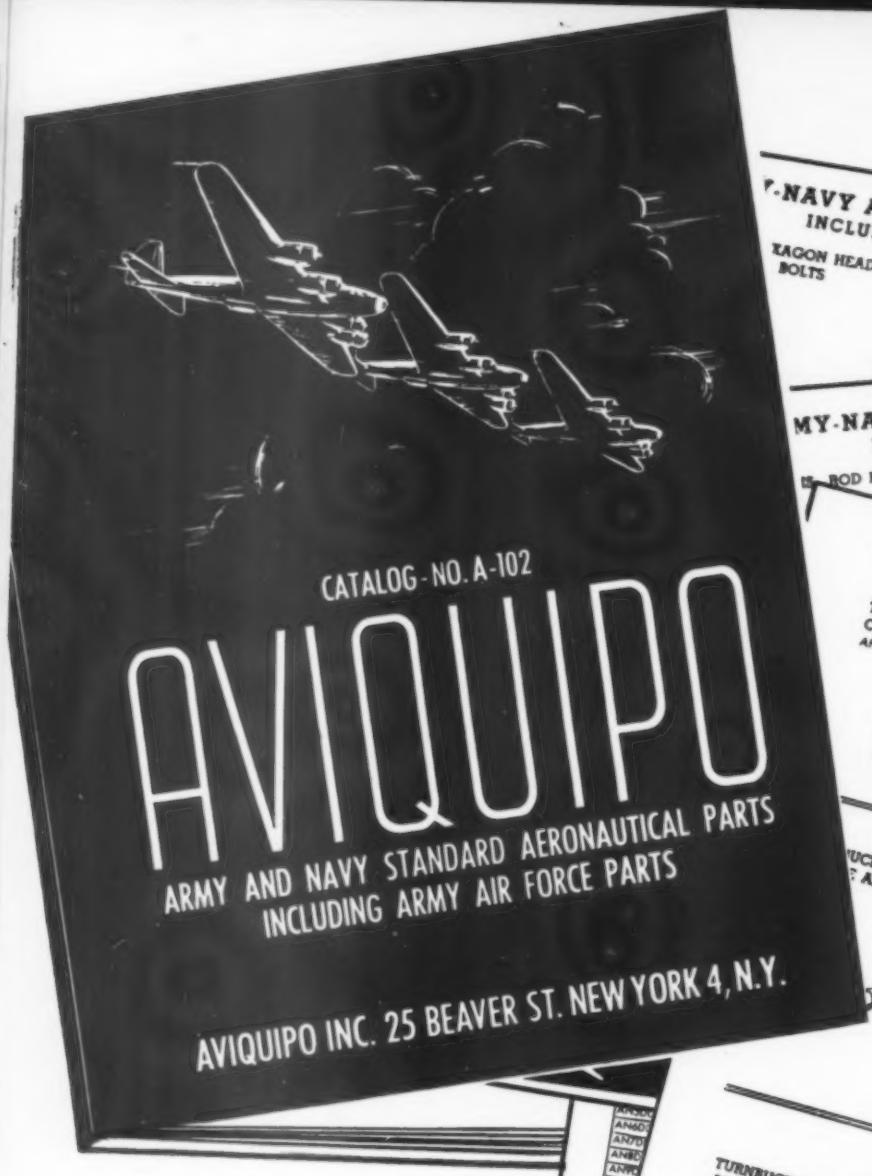

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VICTORIOUS NEW YEAR

Southwest Airmotive and the manufacturers co-operating on this page wish their friends the best of everything the New Year may have to bring. May it be a year of victory, achievement and progress.

We start 1944 with confidence and enthusiasm, knowing that every hour will bring nearer the just peace for which we fight. On the battle fronts, on the production front, and on the home front, we are advancing. We have seized the initiative and we will hold it. Victory is in the air. Let us all do our part to keep it there.

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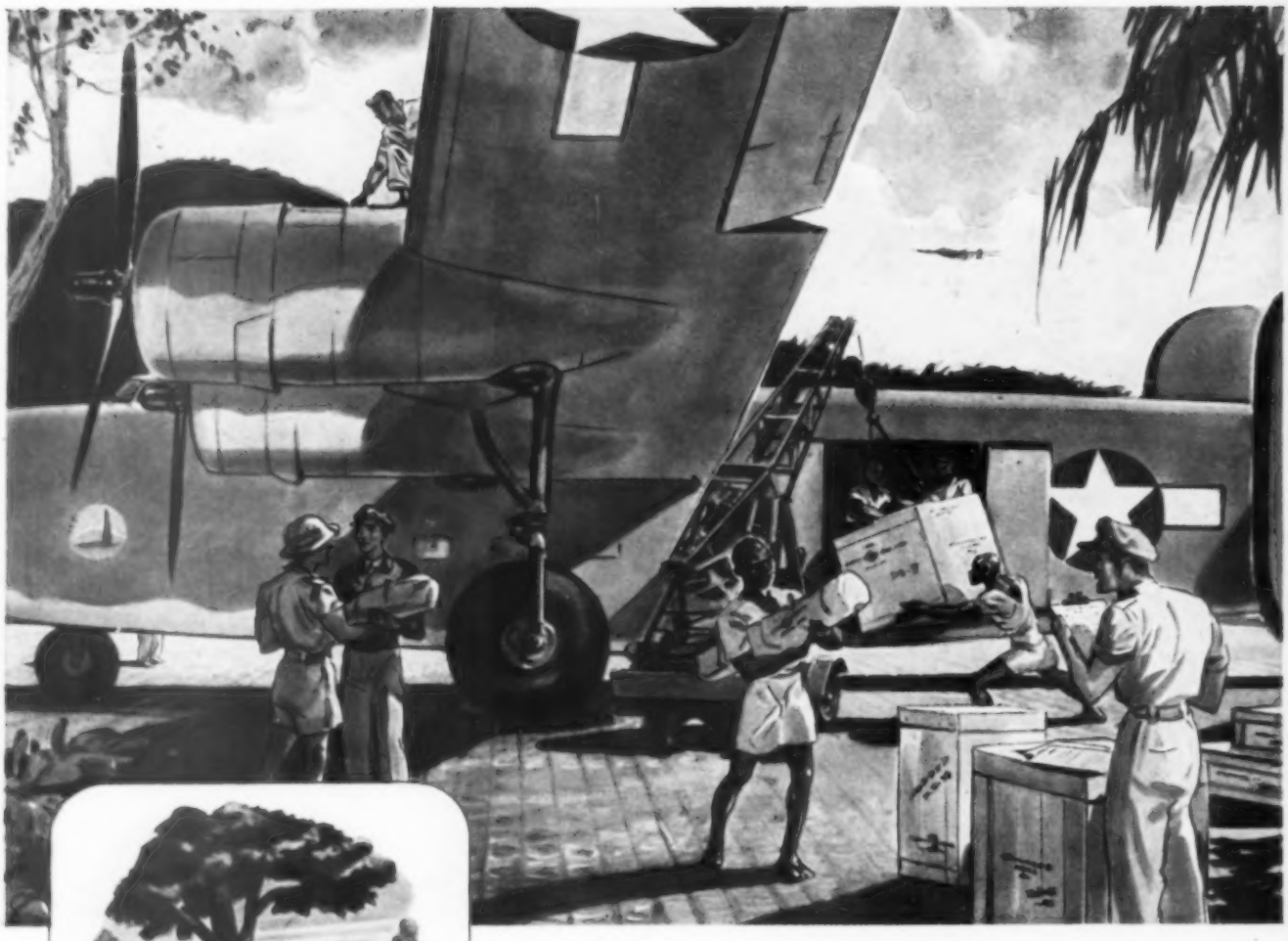

VIBRATION May Have Caused This

Common causes of mechanical failure of automobiles are vibration-loosed connections. And loose connections can result in anything from an annoying body squeak to a loose wheel—and a serious accident. The answer to any vibration-loosed connection is a vibration-proof fastening. After Victory, automobile manufacturers with an eye to added driving safety will protect their cars with Boots Self-Locking Nuts which withstand severest vibration.

More Cargo, When They Fly With Their Boots On

Cargo planes are performing heroic service ferrying men and supplies to the fighting fronts. Almost always loaded to capacity, they are constantly subjected to terrific vibration stress by engines which must strain to the limit to lift the big ships from the ground and keep them in the air. That these planes are able to "take" severest vibration without "coming apart at the seams," is due largely to the vibration-proof Boots Self-Locking Nuts which protect them.

Boots Nuts are not only tough, they are also lighter than other nuts, save many pounds on each plane . . . thus allow for more cargo. In addition, they can be used and re-used as often as desired—literally "outlast the plane." Boots Self-Locking Nuts, standard for every type of U. S. aircraft, meet the exacting specifications of all government aviation agencies.

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